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Market Studies of United States

Steel Castings Market in Illinois,
Indiana, Michigan, Ohio, Pennsylvania,
and Wisconsin





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THE STUDY OF THE STEEL CASTINGS MARKET
IN ILLINOIS, INDIANA, MICHIGAN, OHIO, PENNSYLVANIA, AND WISCONSIN
FOR POTENTIAL OF ENTRY BY CANADIAN STEEL FOUNDRIES



FOR

GOVERNMENT OF CANADA
DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

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- A Steel Castings Consumers and Interviews
- B Projected 1983 and 1985 Carbon and Low Alloy Steel Casting Demand by Market Segment and State
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- M Total Projected Demand, Captive Production, Imports, and Net Available Market for Carbon and Low Alloy, Corrosion Resistant, Heat Resistant, and Manganese Steel Castings by Market Segment
- N Projected 1985 Demand, Supply, and Import Conditions in the Six-State Region for Carbon and Low Alloy, Corrosion Resistant, Heat Resistant, and Manganese Steel Castings by Casting Weight
- P Major Valve Manufacturers in the United States
- R Projected Steel Investment Casting Demand for the Valves and Fittings Market
- S Major Competitive U.S. Steel Foundries in the Six-State Region

PROJECT SCOPE AND OBJECTIVES

This study report has been prepared for the Government of Canada, Department of External Affairs, Ottawa, Canada, and addresses the Steel Castings Market in the five-state East North Central Region of the United States plus the state of Pennsylvania. The market for railroad castings has been excluded from this report. The railroad market is in an extremely depressed condition and it is forecast that the future demand is to be satisfied by highly cost effective U.S. producers. A supply surplus of 20% to 30% is forecast for 1985. The defense market is not included as a separate market segment. However, the major defense market for steel castings, military vehicles, is included in the "Truck" classification. Separate statistics have been included for tank castings.

During the course of the project, the following scope of objectives is considered to have been satisfied:

- Identify and quantify the steel castings market in the six-state region of Illinois, Indiana, Michigan, Ohio, Pennsylvania, and Wisconsin.
- Identify and quantify the major consumers of steel castings in these major market segments:
 - Construction Machinery and Equipment
 - Mining Machinery and Equipment
 - Mill Machinery
 - Trucks, Buses, and Trailers
 - Valves and Fittings
 - Pumps
 - Other Machinery
- Determine demand as related to the following alloy classifications:
 - Carbon and low alloy steel
 - Heat resistant steel
 - Corrosion resistant steel
 - Manganese steel
- Determine demand by casting size ranges as follows:
 - Under 100 pounds
 - 101 to 500 pounds
 - 501 to 1,000 pounds
 - 1,001 to 5,000 pounds
 - 5,001 to 10,000 pounds
 - Over 10,000 pounds
- Determine current competitive casting selling prices by alloy, casting size, and end use market, where possible.
- Establish projections of market growth or decline through 1985.

- Determine casting purchasing criteria used by consumers as related to casting cost, product quality, or unusual conditions.
- Identify current and projected sources of supply quantitatively from captive U.S. foundries, U.S. commercial foundries, and offshore import sources (import sources in this report are considered to be all those supplied from outside the continental United States or its possessions).
- Select and interview consumers of steel castings for the major market segments in the six-state region.
- Identify U.S. markets considered to have potential for the Canadian steel casting producers.
- Identify market entry barriers and preferred sales methods and channels to be used to increase penetration or initially penetrate these markets.

APPROACH TO THE PROJECT

Information from Knight's proprietary data sources and recent marketing projects related to the United States production and consumption of static cast steel castings was reviewed, analyzed, and accumulated as related to the states of Illinois, Indiana, Michigan, Ohio, Pennsylvania, and Wisconsin. These data were then updated to reflect the present economic condition of each market as to current production, consumption, pricing, and import volume effect.

Consumers of steel castings in each of the major market segments located in the subject six-state area were selected for telephone interview. The purpose of these interviews was to establish current purchase volumes; industry changes or trends projected to affect the use of steel castings; preference toward direct supplier contact or use of agents when purchasing steel castings; purchasing policies as to the relative importance of price, quality, and delivery; and policies regarding use of imported supply and prevailing purchase prices of steel castings.

Some major consumers of steel castings, of course, are not located in the subject six-state area. The demand of these major manufacturers situated in states adjacent or close to the subject six-state region has been included in regional tonnage figures and is identified in the exhibits of this report. Two large Kentucky valve producers are included, one in Indiana statistics and one in Ohio statistics. The Pennsylvania demand tonnages include one New York valve producer, one New Jersey valve producer, and one New York pump manufacturer.

The information contained in this report regarding current demand, projected consumption, product pricing, and the impact of imported steel castings is related to each individual market segment and not to the industry as a whole. It has been developed using interview data, Knight's experience in the industry, and information from Knight proprietary sources. The projections are based on our knowledge of industry trends and communication with producers and consumers of steel castings and may not agree with data published by the U.S. Department of Commerce, the Bureau of Industrial Economics, or the various industry trade associations.

All monetary references in this report are expressed in current United States dollars.

THE STEEL CASTINGS INDUSTRY IN THE UNITED STATES

As a preface, it is considered that a brief review of the industry's recent past and general current situation be presented.

The requirements and production of steel castings in the United States between 1972 and 1980 have been generally balanced and, excluding recession years, have been in the 1.8 to 2.0 million tons per year range. Domestic production capacity at the end of this period was considered to be 2.2 and 2.5 million tons per year and was only minimally affected by foreign imports. The economic recession in 1977 caused a reduction of 125,000 tons.

Since 1980, the steel castings market has continued to decrease to a low of approximately 1.0 million tons of shipments in 1982 with projected shipments in 1983 forecast to be approximately 1.14 million tons. This drastic reduction in tonnage is due to the following factors:

- Depressed conditions of the freight car market
- Increase in imports
- The general recessed economy
- Loss of applications to ductile iron

Along with the ever-decreasing casting demand, the excess available foundry capacity, and the continued foreign import pressures, competition among producers for the remaining markets has become intense.

The largest consumer of steel castings in the United States is the railroad industry and represents approximately 40% of the total market. The railroad industry is generally faulted as the main cause in the steel castings market decline. Close study, however, does not confirm this conclusion. Except for 1979 when a record 90,000 new railroad freight cars were built, and the railroad industry consumed 53% of all steel castings, their average consumption as a percentage of total consumption has fluctuated less than 10%. The unusually depressed condition in the freight car market (6,000 cars in 1983) has not reduced the railroad percentage of the total market appreciably. The 1983 level of approximately 39% is expected to return to the normal 40% range as economic conditions improve. This would indicate that average U.S. economic conditions control the fluctuations of the market demand.

Although attrition due to various causes continues to erode the domestic supply side of the industry, especially for the marginally competitive jobbing and railroad equipment castings, domestic supply is projected to exceed demand at least through 1985. Exceptions in specific markets and castings sizes are to be addressed later in this report. The supply capacity remained relatively constant at nearly 2.0 million tons for many years, though railroad castings capacity was increased in the late 1970s. Foundry closings in the last six months have lowered railroad casting capacity by 500,000 tons, while other steel casting capacity has only been reduced 100,000 tons.

Another condition affecting the domestic steel castings industry in the U.S. is the ever-increasing supply of imported castings. Intense foreign price competition is expected to continue to increase in the near term and is to continue pressure to expand the import share of the steel castings markets.

MAJOR MARKET PROFILES AS RELATED TO
THE STEEL CASTINGS INDUSTRY IN THE UNITED STATES

Each major industry market consuming steel castings is affected by different stimuli and trends. These markets have been analyzed and general profiles for each are as follows:

Construction Machinery and Equipment (2nd Largest Steel Castings Market)
and
Mining Machinery and Equipment (4th Largest Steel Castings Market)

It is difficult to separate the Construction Equipment and Mining Equipment markets in reference to the consumption of steel castings. Realistically, ore crushing and dressing equipment and underground mining machinery for drilling, loading, and hauling are singularly used for mining, while earth movers, off-the-road haulers, power shovels, and tractors are peculiar to both industries.

These two industries combined account for approximately 25% of all alloy and carbon steel casting consumption in the United States.

Recent economic conditions considered, these two markets are expected to require approximately 275,000 tons in 1983 with projected compound annual growth rates of 11% and 12%, respectively for Construction and Mining Equipment.

The health of the Construction Equipment industry is heavily leveraged by new residential construction and road building and repair, both of which are currently showing upward trend increases over those previously forecast.

Steel casting usage is continuing to be eroded in the Construction Equipment market by ductile iron conversions in some of the lighter duty drive and axle housings.

Typical castings used in these markets are:

| <u>Parts</u> | <u>Weight Range (Pounds)</u> |
|---|------------------------------|
| Tread Shoes and Track Pads for Crawler Equipment | 30 to 700 |
| Idler Rollers | 40 to 100 |
| Sprockets | 100 to 500 |
| Drive and Axle Housings | 200 to 1,500 |
| Track Links and Guides | 15 to 50 |
| Gear Boxes | 75 to 400 |
| Wheel Hubs | 50 to 250 |
| Miscellaneous Hangers and Brackets | 10 to 75 |
| Liner Plates and Mill Parts for Ore Processing | 100 to 300 |
| Power Shovel Bucket Teeth | 2 to 60 |
| Bucket Bales and Bodies | 1,600 to 15,000 |

The domestic demand/supply conditions favor an excess in supply in 1985 as aggressive, competitive railroad foundries and imports continue to penetrate these markets.

Although 90% of the steel castings consumed by the Mining Equipment market are carbon and low alloy grades, approximately 10,000 tons of various grades of manganese steel are projected for 1983, less than 10% of which are used on O.E.M. units. The balance of wear resistant steel castings is produced by a group of select foundries specializing in the production of blades, power shovel buckets, bucket teeth, and liners and wear plates used in crushing and ore processing. These castings are generally founded on order from parts supply houses or directly from firms engaged in mining or construction as replacement items on operating equipment.

In addition to the wear resistant parts, approximately 2,000 tons of heat resistant castings are forecast for use in the mining industry in 1983. These castings are predominately for primary ore processing equipment with typical parts being hearth chain links, pins, and flights used in heating and sintering operations.

Trucks, Buses, and Trailers (3rd Largest Steel Castings Market)

The demand for carbon and low alloy castings in these markets is expected to be approximately 116,000 tons in 1983 and to exercise a compound annual growth of 4% through 1985.

The trends toward reducing the average weight per vehicle have reflected some minimal casting weight reductions, however, the weight of steel castings per vehicle is projected to decrease by approximately 10% between 1983 and 1985 as the result of conversions from steel to ductile iron castings in drive train housings and wheel spiders.

Steel casting use in these markets is unique in that, except for three major Truck, Bus, and Trailer manufacturers, the component O.E.M. parts are not captively manufactured, but are purchased as finished assemblies from independent manufacturers such as Dana/Spicer, Rockwell International, and Dayton Walther.

Typical steel castings used in these markets are:

| <u>Parts</u> | <u>Weight Range (Pounds)</u> |
|---|------------------------------|
| Small Spring Hangers and Suspension Parts | 5 to 20 |
| Fifth Wheels | 150 to 300 |
| Banjo Housings | 300 to 600 |
| Large Suspension Parts | 70 to 100 |
| Wheel Spiders | 50 to 70 |

Total domestic supply is expected to exceed demand for these parts by 5% to 10% through 1985.

Valves and Fittings - (5th Largest Steel Castings Market)

The Valves and Fittings market as related to the steel casting industry in the United States is highly fragmented. The largest producer is reported to control less than 3% of the total market with the top 20 manufacturers supplying approximately 30%.

The Valve Manufacturers Association, the major industry trade association, projects the following domestic user industries for 1983 to be as follows:

| <u>Industry</u> | <u>Percentage of Total Consumption of Valves</u> |
|---------------------------|--|
| Chemical Production | 15.3% |
| Petroleum Production | 13.9% |
| Power Generation | 13.3% |
| Petroleum Refining | 12.4% |
| Water and Sewage | 9.8% |
| Oil and Gas Transmission | 8.3% |
| Pulp and Paper Production | 5.8% |
| Commerical Construction | 5.8% |
| All Other | 15.4% |

The Valves and Fittings segment of the steel castings industry is highly competitive and is the segment most heavily penetrated by foreign imports. A Steel Foundry Society of America study conducted in February 1983 indicated that approximately 27% of the United States steel valve requirements are imported, although other estimates vary from 11% to 40%.

The primary source of these imports is reported by the U.S. Department of Commerce as follows:

| <u>Country</u> | <u>Percentage of Total Valve Imports</u> |
|----------------|--|
| Japan | 29% |
| Canada | 11% |
| United Kingdom | 11% |
| France | 8% |
| Italy | 8% |
| West Germany | 8% |

The compound annual growth rate for steel valve and valve part castings from 1983 through 1985 is forecast to be approximately 16% with the projected requirements in 1983 to be 70,000 tons of carbon and low alloy.

Corrosion resistant valve requirements for the same period are expected to increase at a compound annual rate of approximately 33% with the 1983 requirements projected to be 17,000 tons.

Of the eight basic types of valves manufactured, the use of ball types shows the greatest increase, from 22% to 33% in the last 10 years, and butterfly valves increasing their share by 2.5% over the same period.

Although the general regional consumption data shown in this report include only the valves produced by the sand and shell mold processes, the industry is showing a heavy trend toward the use of investment castings in the smaller sizes of corrosion resistant, carbon, and low alloy valves and valve components.

The size range of steel castings supplied to the valve market varies from fractions of one pound to tens of thousands of pounds. The majority of the tonnage and pieces falls within the range of the 2 inch valve covers and bonnets between 2 and 4 pounds up to 24 inch balls, discs, and bodies between 400 and 1,000 pounds. Recent Knight studies show approximately 50% of the total pieces produced weigh less than 50 pounds.

It is forecast that domestic supply is to exceed demand by 15% to 20% in 1985 for medium and high volume castings up to 1,000 pounds. Larger valves for low volume orders show a potential 5% short supply by 1985.

Mill Machinery (6th Largest Steel Castings Market)

The demand for new roll Mill Machinery is continuing to decline with raw steel production and growth of the continuous casting processes. The greatest loss is in large steel back-up rolls. It is forecast that the use of continuous cast steel is to increase to 40% by 1989 and decrease the use of steel rolls to a ratio of .31 (roll shipments/raw steel shipments). Steel castings consumption in this market presently is dominated by repair and spare parts replacement of Mill Machinery castings and mill rolls.

Maintenance repair parts typically are one piece or very low volume orders and are currently being produced by the mill captive foundries or low volume commercial jobbing foundries with long-term customer/supplier relationships.

This market has been difficult to penetrate in the past except when major rebuilding programs were involved and unusually high volumes necessitated expanded sourcing. Despite the closing of three roll foundries - Bethlehem, Wear-United (Vandergrift), and Mesta - this supply is forecast to exceed the demand by nearly 20%.

Oil Field Equipment (7th Largest Steel Castings Market)

The recent decline in exploratory and production drilling in the U.S. has greatly affected the consumption of steel castings used in this industry. The oil production market responds to the Mideast political situation, spot market prices, domestic supply/demand, conservation programs, and utilities emission policies, among others.

Even though it is estimated that less than 10% of the Oil Field machinery is manufactured in the subject six states addressed in this report, it has been reviewed because of its total share of the steel castings market.

The total steel castings market, as stated earlier, is little affected by the geographic relationship between producer and consumer. The Oil Field Equipment market, however, seems to be the exception. Casting producers for this market are generally located close to the consuming regions of the South, Southwest, and West.

The forecast consumption of 34,000 tons of carbon and low alloy steel castings in 1983 may be optimistic, but does relate to the current economic conditions. Considering the excessive number of variables affecting this industry, growth projections through 1985 are forecast to be from flat to 5%.

Typical steel castings are as follows:

| | <u>Parts</u> | <u>Weight Range (Pounds)</u> |
|------------|--------------------------|------------------------------|
| Drilling - | Pin Supports | 180 to 210 |
| | Sheave Guards and Plates | 40 to 50 |
| | Block Hook Adapters | 320 to 380 |
| | Swivel Housings | 220 to 360 |
| | Swivel Goosenecks | 50 to 75 |
| Tables - | Turntables | 500 to 1,000 |
| | Bases | 2,000 to 5,000 |
| | Housings | 50 to 200 |
| Drives - | Sprockets | 80 to 100 |
| | Bearing Housings | 100 to 200 |

Engines and Turbines (8th Largest Steel Castings Market)

This field is forecast as flat to declining through 1985 and is affected by new utility installations or modification and upgrading of existing facilities. In the manufacture of large engines for power generation, the castings are primarily iron. Steel castings are used for turbine housings, impellers, and various generator parts such as bases and housings.

Carbon steel castings for this market are continuing to be affected by foreign competition and, in conjunction with the declining industry outlook and declining utility purchases, has resulted in the closing of a major manufacturer's captive foundry.

The demand/supply situation in this classification is affected greatly by imports. If the U.S. dollar devaluates 10% to 15% against the yen and other currencies, imports should decrease and supply shortages could occur.

Special Industry Machinery (9th Largest Steel Castings Market)

The total consumption of steel castings in this market is significant at a projected level of approximately 19,000 tons in 1983. This volume includes corrosion resistant, heat resistant, manganese, and carbon and low alloy castings.

Unlike other major markets where major equipment manufacturers are easily identified, this market is highly fragmented and includes the manufacture of equipment for the food processing, packaging, textile, paper, chemical, tobacco, glass bottle, rubber, foundry, ammunition, and plastics industries. Significant consumers of steel castings for these markets have not been identified in the six-state region considered in this report. Many of the manufacturers of this equipment, however, are known to have relocated from the New England, Atlantic Coast, and Midwest regions to the South Central and Southeastern states.

Corrosion resistant steels are mainly used in the food products industry. Stainless alloys CF8 and CF8M make up 70% of the market. Heat resistant steels are used in reformer and ethylene, centrifugally cast tubes, and return banks for refining equipment. These alloys are normally HH, HK, HT, and nickel-chromium steel alloy.

Pumps (10th Largest Steel Castings Market)

The trends in growth and consumption in this market have in the past and are projected to continue to closely parallel those of the Valves market.

At the projected rate of growth, a potential 8% short supply of carbon steel pump castings over 5,000 pounds could exist in 1985. Demand would also exceed supply by approximately 10% for stainless and other corrosion resistant pump parts over 1,000 pounds during the same period.

The growth of this market section is very dependent on the Oil Field Equipment industry. If oil prices increase, our demand increases for pumping equipment. The pumps market should grow at a rate of 4% per year. The largest growth segment is in stainless steel pump casings. It is especially advantageous to have capabilities to produce stainless alloys, as well as high nickel base alloys as common pattern equipment is generally used to produce the same casting in several alloys.

Industrial Furnaces and Ovens

Overall, this industry consumes less than 1% of the total steel castings produced, but uses over 30% of all of the heat resistant castings. Growth in this market is expected to be minimal to flat at a compound annual rate of 1% to 2%.

These castings predominately fall in the 1 pound to 200 pounds weight classes and consist of small furnace parts, reformer and ethylene tube bends, and Ys and heat treatment baskets and trays. Reference in this report is to static cast parts and does not include centrifugally cast reformer and ethylene tubes projected at a level of approximately 9,000 tons in 1985.

Production of these industrial castings is presently supplied by specialty foundries producing heat resistant products.

STEEL CASTING CONSUMER INTERVIEW SURVEY

Contact was made with steel castings consumers in the following user markets:

- Construction Machinery and Equipment
- Truck, Bus, and Trailer Equipment
- Mining Machinery and Equipment
- Valves and Fittings
- Mill Machinery
- Pumps
- Machine Tools
- Industrial Trucks
- Furnaces and Ovens
- Motors and Generators
- Special Industry Machinery
- Tanks (Military)

Although the large majority of the interview candidates is considered to be heavy tonnage users of steel castings in the manufacture of their end products, effort was also extended to gather data on the lesser volume users in an attempt to provide a greater cross-section of the consumers.

Detailed information obtained from the contact survey is shown in Exhibit A and includes:

- Market identification
- User company name
- User company address
- User company phone
- Contact name and position, when available
- Projected 1983 demand in tons by alloy
- Tonnage distribution by casting weight
- Purchasing criteria
- Foreign or import supply policies
- Location of user plants for those firms with multiple facilities

The following is a summary of the survey results:

| | <u>Number</u> | <u>Percentage of Respondents</u> |
|--|---------------|----------------------------------|
| Total number of firms contacted | 64 | 100 % |
| Number responding to some or all of the questions | 57 | 89 |
| Number responding, but requesting that the source of information remain confidential | 20 | 35 |
| Respondents stating price as primary purchasing criteria | 21 | 37 |
| Respondents stating quality as primary purchasing criteria | 30 | 53 |
| Respondents stating price and quality given equal consideration | 6 | 11 |
| Respondents with strict anti-import policies | 0 | 0 |
| Respondents reporting some current import supply | 10 | 18 |

Projected 1983 tonnage (all alloys) represented by respondents is 155,000.

Information relative to the prices being paid by the respondents for commercial steel castings was most difficult to obtain. Some stated that this type of information was confidential, while others provided these data by alloy group. Some, however, categorized their purchases by alloy and casting weight and are shown in Exhibit A.

A discussion of the responses is discussed in a subsequent section of this report.

PROJECTED DEMAND FOR STEEL CASTINGS IN THE UNITED STATES

The 1983 steel casting demand information from Knight sources and the respondent interview contacts was analyzed by major market segment and alloy for the individual states of the six-state region addressed in this study.

Carbon and Low Alloy Steel Castings

The 1983 consumption of carbon and low alloy steel castings in the United States is expected to be approximately 1,055,000 tons and is projected to be approximately 1,254,000 tons in 1985, equivalent to a compound annual growth rate of 9%.

Exhibit B shows a detailed analysis of the aforementioned carbon and low alloys steel casting demand and is summarized as follows:

| <u>State or Area</u> | <u>1983 Tons</u> | <u>1985 Tons</u> |
|-----------------------|------------------|------------------|
| Illinois | 82,110 | 100,041 |
| Indiana | 32,630 | 39,010 |
| Michigan | 64,327 | 70,886 |
| Ohio | 117,136 | 138,835 |
| Pennsylvania | 62,442 | 75,130 |
| Wisconsin | 51,065 | 62,153 |
| Other or Unidentified | 645,290 | 768,045 |

Other or Unidentified is the classification for all steel castings produced outside of the six states listed, all railroad castings, and castings produced for unidentified markets.

These six states are considered to represent approximately 66% of the non-railroad steel casting consumption.

As stated earlier in this report, the railroad industry is the largest tonnage consumer of carbon and low alloy steel castings followed in order of magnitude by:

- Construction Equipment
- Trucks, Buses, and Trailers
- Mining Equipment
- Valves and Fittings
- Mill Machinery
- Oil Field Equipment
- Engines and Turbines
- Pumps

Corrosion Resistant Steel Castings

Analysis of the corrosion resistant steel casting market is shown in Exhibit C. The total consumption of corrosion resistant castings in 1983 is expected to be approximately 39,000 equivalent to 3.4% of total steel castings demand.

The 1985 demand level is projected to be approximately 56,600 tons reflecting a compound annual growth rate of 20%.

The Valves and Fittings and Pumps markets account for approximately 60% of the corrosion resistant castings. Growth in the Valves and Fittings market is projected for 33% per year between 1983 and 1985.

Regional demand for corrosion resistant castings is as follows (see Exhibit C):

| <u>State or Area</u> | <u>1983 Tons</u> | <u>1985 Tons</u> |
|-----------------------|------------------|------------------|
| Illinois | 1,060 | 1,630 |
| Indiana | 1,100 | 1,640 |
| Michigan | 280 | 470 |
| Ohio | 8,320 | 12,800 |
| Pennsylvania | 5,475 | 8,300 |
| Wisconsin | 615 | 960 |
| Other or Unidentified | 22,150 | 30,850 |

Heat Resistant Steel Castings

Exhibit D identifies the distribution of heat resistant steel castings by market segment and state. The projected tonnage shown in this exhibit reflects only the static cast parts and does not include approximately 9,000 tons per year of centrifugally cast reformer and ethylene tubes used in Industrial Furnaces and Ovens.

Static cast demand of heat resistant casting for 1983 is projected at 20,500 tons and is forecast for a growth rate of 5% per year through 1985.

The Industrial Furnaces and Ovens industry represents approximately 34% of the heat resistant castings market followed by Special Industry Machinery and Mining Equipment.

A summary of Exhibit D is as follows:

| <u>State or Area</u> | <u>1983 Tons</u> | <u>1985 Tons</u> |
|-----------------------|------------------|------------------|
| Illinois | 1,805 | 2,025 |
| Indiana | 905 | 955 |
| Michigan | 1,005 | 1,130 |
| Ohio | 3,380 | 3,715 |
| Pennsylvania | 2,850 | 3,150 |
| Wisconsin | 925 | 1,065 |
| Other or Unidentified | 9,630 | 10,560 |

Manganese and High Wear Resistant Steel Castings

The variable terms of reference and definitions of manganese steel castings make it difficult to positively separate the varieties containing over 10% manganese from some of the wear resistant steels containing from 3% to 7% manganese but with total alloy content exceeding 10%.

Exhibit E shows the distribution of manganese steel casting demand and includes the high wear resistant grades containing less than 10% manganese.

Tonnage consumption for these grades of steel castings is expected to be approximately 28,000 tons in 1983 and is projected to increase at the rate of 10.5% per year through 1985.

The largest consumer industries for these castings are the Railroad and Mining Equipment segments, each at a current rate of 10,000 tons per year. The railroad products are predominantly track specialties such as frogs, crossovers, and switch components of the high manganese, Hatfield grades; the mining usage is generally of the high wear resistant type with under 10% manganese. The lower content grades are also used in the Construction Equipment fields, the third largest consumer.

Approximately 90% of the manganese containing wear resistant steels used in the Mining Equipment market are spare parts such as scraper blades, power shovel bucket parts and teeth, and liners and plates for crushing and other ore processing. Only 10% of the castings are reported to be used in the manufacture of new equipment.

A summary of the demand by state for these products is as follows:

| <u>State or Area</u> | <u>1983 Tons</u> | <u>1985 Tons</u> |
|-----------------------|------------------|------------------|
| Illinois | 670 | 860 |
| Indiana | 210 | 250 |
| Michigan | - | - |
| Ohio | 1,110 | 1,340 |
| Pennsylvania | 650 | 810 |
| Wisconsin | 1,780 | 2,200 |
| Other or Unidentified | 23,580 | 28,640 |

DEMAND DISTRIBUTION BY CASTING WEIGHT

The demand distribution of the various alloy groups of steel castings by casting weight was addressed in the interview survey, the results of which are shown in Exhibit A. It is felt, however, that when considering the disciplines of the interview candidates and that these types of data are not normally immediately available, the responses were considered to be estimated.

Using data developed in recent studies for consumers and supplier foundries in the major steel castings markets, in conjunction with the resulting survey response, a detailed analysis of the demand tonnages by major market, casting size range, state, and alloy has been prepared and projected for 1985.

Exhibit F is addressed to carbon and low alloy castings, Exhibit G to corrosion resistant castings, Exhibit H to heat resistant castings, and Exhibit J to manganese and wear resistant castings.

Exhibit F, page 1 of 6, describes the market for carbon and low alloy steel castings in the State of Illinois, forecasted to reach 100,000 tons by 1985. The main market for steel castings in Illinois is with the Construction Equipment manufacturers, which includes the three largest in the U.S., namely, Caterpillar, Deere & Co., and International Harvester. The majority of the castings for O.E.M. producers such as these are medium to high production quantities of steel castings in under 100, 101 to 500, and 501 to 1,000 pound weight ranges for use in off-the-road vehicles. Steel castings are used in these applications because of their toughness and low temperature impact resistance.

It is forecasted that Caterpillar is to purchase nearly 50,000 tons of steel castings in 1983. These purchases could increase by 50% by 1986 to return to levels of purchases in the late 1970s. Deere & Co. is forecast to purchase nearly 3,500 tons in 1983 and Fiat-Allis 2,000 tons.

Other markets for carbon steel castings in Illinois are relatively small and divided among the other industrial markets as shown.

Markets for carbon and low alloy steel in the State of Indiana, Exhibit F, page 2 of 6, are forecast to consume approximately 40,000 tons in 1985. No one market is expected to dominate the picture, though the steel industry in the northern part of the state is expected to consume nearly 4,300 tons in 1985. The two largest markets are Construction and Mining Equipment.

The usage of non-railroad carbon and low alloy steel in the State of Michigan (Exhibit F, page 3 of 6) is dominated by the Truck market, which is forecast to consume nearly 50,000 tons of castings per year in 1985. As is explained on page 7 of this report, the steel casting use is unique in this market. Except for three major manufacturers, the component O.E.M. parts are not captively manufactured, but are purchased as finished assemblies from independent manufacturers such as Rockwell, Dana/Spicer, and Dayton Walther. Construction Equipment is the second largest consumer of castings with a forecasted annual tonnage of 11,900 tons in 1985.

Manufacturers in the State of Ohio are the largest consumers of non-railroad steel castings, as is shown in Exhibit F, page 4 of 6.

It is forecast that 35,800 tons of castings used in Mining Equipment are consumed in Ohio by such manufacturers as Euclid-Daimler, Terex, National Mines, Marion Power Shovel, American Alloy, Owens Bucket, and others. Many of the applications of steel castings could be considered "Construction Equipment" parts, however, most are classified under Mining Equipment.

Approximately 30,000 tons are forecast for carbon and low alloy steel castings for Trucks, Buses, and Trailers. White Motor, International Harvester, Rockwell, and Dayton Walther are large consumers of steel castings.

Construction Machinery and Equipment is the third ranking consuming industry in Ohio. Galion, Jeffery, Terex, and Euclid are large purchasers of castings.

Carbon and low alloy cast steel valves are forecast to reach 24,700 tons in 1985 in the State of Ohio. Such large valve producers as Xomax (Tufline), Powell, Conval & Duriron are consumers of steel castings.

Mill Machinery Equipment is also a large consumer of carbon steel castings in Ohio. Such manufacturers as Republic, Armco, Copperweld, U.S. Steel, Bliss, Production Experts, Pollock, and others are to purchase a forecasted 14,000 tons in 1985. Most of the mill castings are over 1,000 pounds in weight.

Mining and Construction Machinery and Equipment is also the largest consumer of steel castings in Pennsylvania with a forecast of 33,000 tons in 1985. However, Valves and Mill Machinery are also large consumers at 13,000 and 10,000 tons, respectively. This information is shown in Exhibit F, page 5 of 6.

Valve companies located in Pennsylvania are Pittsburgh Brass, Rockwell, Walworth, Dresser, American, Bailey, and others.

Pennsylvania is the largest user of steel castings in Mill Machinery with consumers such as U.S. Steel, Bethlehem, J & L, Wean, Lukens, Mesta, and Mackintosh-Hemphill.

Nearly 50,000 tons of carbon steel castings are forecast for consumption in the State of Wisconsin in 1985, as is shown in Exhibit F, page 6 of 6. Major consumers are J. I. Case, Drott, Harnischfeger, Manitowoc, American Hoist, Allis Chalmers, and others.

The State of Illinois is not an exceptionally large consumer of corrosion resistant steels, as shown in Exhibit G, page 1 of 6. However, there are two large valve consumers, Rockwell (Hills-McCanna) and Pratt, in the state. Most of the valves purchased by these companies are in the 0 to 500 pounds weight range.

The consumption of corrosion resistant steel castings in Indiana, as shown in Exhibit G, page 2 of 6, is only slightly larger than in Illinois at 1,640 tons annually. The main consumers are Conval and ITT.

As shown in Exhibit G, page 3 of 6, the demand in Michigan is only 470 tons per year. In Ohio, however, it is forecast to consume 12,800 tons of stainless castings in 1985, as shown on page 4 of 6 of this exhibit. The largest valve producers, Conval, Xomax, Vogt, Ladish, Duriron, Brighton, and Crane Company, are located in Ohio or on the Kentucky border.

Pennsylvania is also a large consuming state for pumps and valves and other stainless castings. Goulds (Seneca Falls, New York) and Ingersoll-Rand (Phillipsburg, New Jersey) are large consumers of stainless pump castings near Pennsylvania. The state also has the majority of the stainless foundries, i.e., Quaker, Lebanon, Dodge, Empire, and Penn Steel. Exhibit G, page 5 of 6, shows the breakdown by weight range.

The main consumer of stainless castings in Wisconsin is Ladish, near Milwaukee, a valve producer. As is shown in Exhibit G, page 6 of 6, a total of 960 tons per year is forecast.

Exhibit H, pages 1 through 6, shows the demand for heat resistant steel castings. The largest demand is from manufacturers of furnaces and ovens located in Michigan (automotive), Ohio (automotive), and by heat treat equipment manufacturers in the other states.

Non-railroad manganese steel castings are primarily purchased for the Construction Equipment and Mining industry as shown in Exhibit J.

More in-depth information in regard to casting sizes is presented in Exhibit K. This exhibit provides the following information for each alloy composition projected for 1985.

- Total tonnage demand by state, by casting weight
- Domestic demand/supply ratio by casting weight
- Average 1983 selling price per pound, by casting weight
- Average 1983 domestic supplier production rate in man-hours per ton
- Average domestic supplier 1983 hourly labor wage rate (including fringe benefits)
- Projected 1985 import tonnage by casting weight

Exhibit K, pages 1 through 4, summarizes the market conditions by state and weight range and establishes competitiveness comparisons.

It is to be noted that the labor rate (fringe loaded) does not vary significantly from state to state. It does vary as is shown by size range from \$11.80/hour for foundries producing smaller castings to \$11.00/hour for foundries producing larger castings. These are weighted averages and can be used for comparison. However, there are special cases where rates can be 40% to 50% higher.

Selling prices for carbon steel vary from \$0.88 to \$1.10 per pound, however, imports are known to be from \$0.60 to \$1.00 per pound. Carbon steel valve castings in large lots were normally priced at \$1.10 to \$1.30 per pound, but have been reduced to meet imports. A recent delivery of carbon steel valve castings from Spain, for example, was picked up at a New York dock for \$0.90/pound.

Prices for corrosion resistant steel castings have been reduced to 1978 levels. For example, CF-8M valve bodies are being sold at \$3.50 per pound with imports sometimes priced at 20% less.

The demand/supply conditions forecast for 1985 as shown indicate an overall surplus of supply for all castings under 5,000 pounds.

Exhibit L, pages 1 through 8, describes the distribution of casting weight ranges by percent of total tonnage consumed in each state. This is shown for analysis purposes only as the estimated tonnages were shown in Exhibit K.

Exhibit M has been developed to relate the 1985 projected demand, captive production, and import volume. This information is shown for each major market segment and alloy group and indicates the net tonnage available in each market segment for production by domestic or foreign commercial steel castings foundries.

The larger captive producers in Construction Equipment are Bucyrus-Erie (South Milwaukee, Wisconsin), American Hoist and Derrick (Minnesota and Michigan), and Marion Power Shovel (Ohio). The major steel companies, Bethlehem and U.S. Steel, have captive foundries in Pennsylvania. The major captive steel foundries servicing the truck industry are operated by Dayton Walther and Rockwell International. The total captive production of carbon and low alloy steel castings is estimated at approximately 45,500 tons, or less than 10% of the demand.

It is estimated that imports are equivalent to approximately 24% of the total demand for carbon steel castings with valve casting imports reported to be 40%.

The net available market for jobbing producers is shown for all market segments and is equal to demand less captive production.

Exhibit N further defines the projected demand/domestic supply and import conditions for 1985 including casting alloy group:

- Six-state regional demand by casting weight
- Six-state regional excess or shortage of domestic supply by casting weight
- Six-state regional import tonnage by casting weight

It is shown that shortages of supply are forecast to exist in the castings of 5,000 pounds and over.

SPECIAL ANALYSIS OF THE VALVES AND FITTINGS MARKET

A great deal of useful information has been made available by this and other similar projects on the subject of the relationship of the steel casting industry to the Valves and Fittings market in the United States. Some of the data considered to be of use to the Canadian Steel Castings Industry have been included in this report.

Exhibit P shows 31 companies considered to be the major manufacturers of valves in the United States and their 1983 projected tonnage demands for corrosion resistant and carbon and low alloy steel castings. The following additional information is presented:

- Manufacturing plant locations of the various firms
- Demand by casting size for sand molded castings
- Demand by casting size for shell molded castings

Manufacturers of Valves and Fittings in the United States are noticeably showing increased preference for steel castings up to 100 pounds produced by the investment molding process. Several benefits are cited for this trend.

Although the initial cost of the rough casting produced by the investment molding process is greater than that produced by conventional sand and shell molding methods, the high casting costs are reported to be offset by the following benefits:

- Reduction in initial foundry tooling costs
- Increased foundry tooling life
- Reduced machining costs
 - 27% less than sand castings
 - 7% less than shell castings
- Reduced casting weights
 - 25% less than sand castings
 - 10% less than shell castings

Approximately 23,000 tons of steel investment castings are expected to be used in the production of Valves and Fittings in 1983 with projected growth of 25% per year through 1985.

Exhibit R shows the projected demand for steel investment castings in the Valves and Fittings industry by state and alloy for 1983 and 1985. The investment casting industry is one of the few casting industries in which U.S. exports continue to exceed imports.

IMPORT CONDITIONS OF THE STEEL CASTINGS INDUSTRY

The domestic demand for steel castings, based on U.S. Bureau of Census information and data from societies and others, has normally been expressed in the weight or value of castings shipped from producing foundries. Exports were never known exactly, but always exceeded imports with U.S. demand expressed as being the same as shipments. It was, at the least, a conservative estimate and of little consequence.

Beginning in 1981, and accelerating in 1982 and 1983, imports of steel castings have gained rapidly and now exceed exports in most market sectors. It is, therefore, necessary to know the import conditions for each market section to determine the actual demand.

Based on reports from societies, producers, forecasters, and government information, the following import percentages have been developed for the market sectors discussed in this report. These percentages can be used to determine the tonnage imported in each state because individual statewide percentages are nonexistent.

$$\text{Imports/Demand} = \frac{\text{Imports (Tons)}}{\text{Total U.S. Demand (Tons)}}$$

| <u>Market Sector</u> | <u>(Percentage) Carbon & Low Alloy Steel</u> | | <u>(Percentage) Heat Resistant Steel</u> | | <u>(Percentage) Corrosion Resis- tant Steel</u> | |
|-----------------------|--|-------------|--|-------------|---|-------------|
| | <u>1983</u> | <u>1985</u> | <u>1983</u> | <u>1985</u> | <u>1983</u> | <u>1985</u> |
| Valves | 35 | 40 | 15 | 15 | 15 | 20 |
| Turbines | 30 | 30 | - | - | - | - |
| Construction | 26 | 30 | - | - | - | - |
| Mining | 17 | 20 | 17 | 20 | - | - |
| Oil | 26 | 30 | 16 | 20 | - | - |
| Industrial Trucks | 14 | 20 | - | - | - | - |
| Roll Machinery | 15 | 15 | 15 | 15 | 15 | 15 |
| Specialty Industries | 20 | 20 | 25 | 30 | 20 | 25 |
| Pumps and Compressors | 16 | 20 | - | - | 16 | 20 |
| Industrial Ovens | - | - | 15 | 20 | - | - |
| Truck | 17 | 20 | - | - | - | - |

Castings are imported because of the lower cost to the buyer at equivalent quality. Carbon steel valves are being purchased at delivered prices 15% to 20% below the lowest domestic prices. Other castings can be purchased at prices 5% to 15% below domestic prices.

The major exporters of steel castings to the United States are Japan, Canada, South Africa, Korea, Spain, Italy, France, Mexico, Taiwan, and India.

PREFERRED METHODS AND CHANNELS FOR SUPPLYING STEEL CASTINGS TO UNITED STATES MARKETS

An analysis has been made of U.S. steel foundries and end-use companies to determine preferred methods for market entry by Canadian foundries.

Imports of steel castings to this country from foreign countries are mainly made through agents in major U.S. cities, by export/import trade companies, and by specific foreign government associations. Their objective is to provide information to potential consumers on producing foundries in specific countries and let the consumer make direct contact with the foundries. It is, however, beneficial to have an aggressive sales plan. Many consumers send representatives to the exporting countries to visit foundries to solicit quotes. Originally, foreign producers were only interested in large quantity orders, however, this has changed. Many foundries now quote on small lot orders, depending on the size, metal, and specifications.

The main problems to the end users are responsiveness to change, responsiveness to quick delivery, replacement of scrapped castings, currency exchange values, customs documentation, service, metallurgical assistance, application engineering, and general goodwill. Of course, large cost reductions are often good trade-offs for these liabilities.

The objective of Canadian producers would be to provide all of the above, along with competitive pricing, while U.S. domestic demand/supply conditions are not favorable.

U.S. producers normally sell through direct sales in major consuming areas and use manufacturers' representatives in more remote areas. Direct sales programs are necessary in the following markets where salesmen must offer specialist services:

- Heat resistant steel castings for tubes and bends to ethylene and ammonia plants
- Carbon steel and alloy steel castings for nuclear power plants
- Corrosion resistant steel and high alloy castings for military usage
- Steel mill roll castings
- X-ray quality castings for high pressure applications

Direct sales is also important to large consumers such as:

Caterpillar Tractor
Deere & Co.
International Harvester
J. I. Case
Rockwell International

However, if a representative or agent is well known by the consumer, it is sometimes useful to use a representative for a faster entry. No matter which method is used, the large consumer normally visits the casting facility to determine its capabilities before approval is made to classify the foundry as a potential source.

One example of a sales organization of a typical Ohio foundry producing carbon steel is as follows:

| Castings Sales Manager | <u>Territory</u> |
|--------------------------------|--|
| One Sales Engineer - | Western Michigan Chicago Milwaukee |
| Two Sales Engineers - | Ohio Indiana Pennsylvania Illinois (except Chicago) |
| Three Sales Representatives - | Southwestern U.S. Eastern U.S. Special Ohio Accounts |
| One Sales Service Specialist - | Quality troubleshooter and regular customer visitation |

The following major entry barriers exist and must be overcome to achieve successful penetration of the subject market sectors:

- Valves
 - No unusual major barriers as imports are near 40%.
 - Casting quality must be acceptable.
 - Must compete with other nondomestic suppliers.
- Construction Equipment
 - Major consumers require qualification acceptance.
 - Strong consumer loyalties to suppliers exist.
 - Price retaliation by long-term suppliers is exercised.
- Mining Equipment
 - Must compete with established nondomestic suppliers.
 - Barriers considered to be similar to the Construction Equipment sector.

- Trucks, Buses, and Trailers

- Supplier loyalty very important.
- Must show substantial price advantages.
- Major consumers require qualification acceptance.
- Must be responsive to delivery schedules and impromptu order changes as consumers carry minimal inventories.

In order to remove the major entry barriers, the following suggestions should be considered:

- Be competitive with other foreign country producers.
- Qualify for large consuming companies.
- Use a direct sales approach to large companies.
- Use representatives to cover specific areas when representatives have special contacts with major consumers.

COMPETITIVITY AND PENETRATION POTENTIAL OF CANADIAN STEEL CASTING FOUNDRIES

The definition of "Competitive" means many things to consumers and suppliers in the United States steel castings markets. Generally, each of the following characteristics attributed to a supplier foundry is weighted differently by the various consumers:

- Dollar cost of the casting
- Quality of the casting
- Special services provided, such as application engineering assistance and field service
- Prompt adherence to delivery schedules
- History of customer/supplier relationships and the fostered loyalties

The interview survey conducted during this project and confirmed by other recent Knight studies indicates little or no reluctance toward the use of imported castings by United States consumers if cost advantages can be achieved and quality levels are acceptable.

Canadian steel casting producers considering entry into the United States steel casting market must know their position relative to the domestic commercial castings foundries and the other foreign suppliers with whom they must compete.

Exhibit S has been prepared to show the United States steel castings foundries considered to be among the most competitive within the six-state region addressed in this report. This exhibit identifies the industries serviced by the foundry, its nominal annual capacity, the alloys produced, and the productivity level in man-hours per ton. Productivity indices (man-hour/ton), of course, vary significantly depending on product mix. Based on product mix, competitiveness comparisons can be made. However, it must be recognized that selling price comparisons give one a better comparison of competitiveness.

Although this information can be used as a guideline, it must be recognized that geographical regions of supply in relationship to the location of the consumer are considered to be irrelevant.

The dominate factor affecting increased penetration of the United States steel casting market by Canadian foundries is cost of castings to the consumer. There are other factors, however, which are considered to have impact. The major markets have been reviewed in relation to these factors and some subjective evaluations made as to their effect on increased Canadian penetration.

- Competitiveness and Pricing - The most competitive market, currently, is the Valves and Fittings sector followed by Construction Equipment, and Trucks, Buses, and Trailers. The high piece part volume requirements for Valves and Construction Equipment make them good candidates for long run volume producers generally operating with low manufacturing costs. The Truck, Bus, and Trailer market, in spite of volume requirements, has tended to favor domestic supply.

The major consumers in this market are finished component producers who require excellent communication, quality, engineering, and field service from suppliers who can respond to short notice design and order changes.

Potential for increased penetration is considered to be favorable in the Valves and Fittings sector based on knowledge currently in-house relating to exporting foundries and especially toward the corrosion resistant castings projected for demand increases of 33% per year through 1985. Favorable demand supply conditions for the larger, low volume castings should enhance the potential.

The greatest opportunity is considered to exist for the large, low volume carbon and low alloy, and corrosion resistant castings over 5,000 pounds in which supply shortfalls of between 5% and 10% are projected on an industrywide basis.

- Delivery Requirements - Important, but normally not a problem for import suppliers if customary casting lead times are adhered to.
- Service Requirements - This factor was not cited as an important criteria in purchasing castings, although it is common knowledge that the major Construction Equipment producers and the Truck, Bus, and Trailer market place great emphasis on this service. Canada, with close proximity to these markets, should have a distinct advantage over other foreign producers.
- Quality - Quality does not appear to have been a major deterrent to foreign foundries. It is felt, however, that exporters of steel castings to the United States have not substantially penetrated the markets which require the higher quality, sophisticated castings. Canadian foundries may very well be competitive with the U.S. suppliers of these castings. The high tech/high quality castings are primarily associated with the following markets in the large casting size ranges:
 - Engines and Turbines
 - Valves and Fittings, both carbon and corrosion resistant
 - Special Industry Machinery
 - Pumps, carbon and low alloy, and corrosion resistant steels

- Personal Relationships - It is difficult to evaluate personal relationships between suppliers and consumers. More important are the value of long-term supplier/customer associations, especially in the smaller less dominate markets. These relationships have been fostered through the years and have served the supplier with stable customers and the customer with guaranteed supply during industry demand peaks.
- Representation - Addressed in a previous section of this report.
- Geographical - Except in the Oil Field Equipment industry where both demand and supply are concentrated in Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, Texas, and California, the proximity of supplier to customer is not relative.
- Freight, Custom Duties, Casting Price - These three factors cannot be considered on an individual basis, as the sum of the three represent the total cost to the consumer. Freight costs for Canadian suppliers in the industrial areas of Ontario and Quebec which are adjacent to the six-state market should provide advantages over other foreign suppliers and be competitive with out-of-region U.S. domestic foundries.

The impact of customs tariffs was agreed to be outside the scope of this study. They must be considered, however, as a part of the total consumer casting cost. When considering the current major exporters of steel castings to the United States, it is not felt that Canada would be at a comparative disadvantage. It should be noted, however, that the current high level of imported steel castings has resulted in increased pressure from the U.S. steel castings producers for legislation which would provide some form of import relief. The present administration has generally opposed trade restrictions of this nature and has given no indication of forthcoming policy changes. Should restrictive measures be adopted, the opportunity for Canada and other exporting countries could be adversely effected.

Actual casting price is the third major component of cost to the consumer. Selling prices of castings produced by domestic U.S. foundries have been established for the various alloys and casting size ranges (Refer to Exhibit K). These prices are considered to be based on actual production costs and include nominal profit margins relative to the markets serviced. It has, however, been impossible to establish the actual manufacturing cost of foreign suppliers. It is common knowledge that labor costs are lower in some foreign countries, but it is sometimes difficult to establish the government support levels provided to encourage exports.

- Demand/Supply - Domestic U.S. demand/supply conditions have had little effect on import volumes of the major markets where casting cost is indicated as a primary criteria of purchase.

- Profit Margin Potential - Profit margin potential for the Canadian exporting foundry is considered to be most favorable in the markets exerting minimal overall pricing leverage. Included among these markets are:

- Carbon and Low Alloy Castings

- Tools and Dies
 - Special Industry Machinery
 - Pumps
 - Motors and Generators

- Corrosion Resistant Castings

- Special Industry Machinery
 - Pumps (Excellent growth potential)
 - Valves (Excellent growth potential)

Giving consideration to the overall steel casting demand in the United States, the excess supply capability of domestic foundry capacity, and the ever-increasing volume of imported castings consumed in most market segments, indicates that the primary competitors to Canadian steel foundries for the U.S. steel castings market are foreign suppliers.

CONCLUSIONS

The six-state region of Illinois, Indiana, Michigan, Ohio, Pennsylvania, and Wisconsin addressed in this study are considered to generate approximately 63% of the non-railroad steel castings demand in the United States.

Although the production capacity of non-railroad related steel castings in the six-state region is considered to exceed demand, there are no geographic distinctions regarding supply in relationship to the location of the consumer. All six states import and export steel castings between states within the region and outside the region.

The foreign importation of castings is having a greater effect on the steel casting segment than any other area of the cast metals industry even though domestic supply exceeds demand.

Provided quality is acceptable, purchase cost of castings to the consumer is still the primary purchasing criteria. Since a competitiveness analysis of the Canadian steel casting producers is outside the scope of this study and has not been developed, it must be assumed that some of the foreign facilities are competitive in the world market as many currently export to the United States.

Although United States consumer/supplier relationships and loyalties exist to some extent, consumers show little, if any, reluctance to foreign supply. Canadian steel foundries must consider the pricing of other foreign sources of supply as their major entry barrier for greater penetration of the United States steel casting market. Competitiveness comparisons must be made by individual steel foundries in order to evaluate their potential for entry or increased penetration in the export of steel castings to U.S. markets.

Growth markets which offer potential for participation in the U.S. market for steel castings are:

- Greater than 1,000 pounds carbon and corrosion resistant steel markets where a supply shortage could exist
- The O.E.M. Construction Equipment market where a concentration of large consumers exists in Illinois and Ohio
- Valve market for foundries which can offer competition to other foreign suppliers
- Pump casting market for foundries which can produce many alloys from single pattern equipment
- Mill Machinery Equipment in Pennsylvania and Ohio where demand/supply conditions indicate possible shortages

EXHIBITS

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | | Purchasing Criteria | Foreign Procurement Policies | |
|---------------------|---|----------------------------------|---------------------------------------|--|------------------------------------|-------------------------------|---------------------|----------------------|------------------|---------------------|------------------------------|---|
| | | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | | |
| | | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | Over 10,000 Lbs. | | | |
| Valves and Fittings | | | | | | | | | | | | |
| 1. | Pipeline Development Co. 1831 Columbus Road Cleveland, OH 44113 216-696-7055 | E. V. Rogers Purchasing Dept. | 1,000 Carbon | | | 1,000 \$0.84 | | | | | 1. Quality 2. Price | Open if Price and Quality Acceptable |
| 2. | Rockwell International 400 Maple Avenue Carpentersville, IL 60110 | | 2,015 Carbon 510 Corrosion | 1,100 | 500 | 185 | 85 | 60 | 75 | | 1. Quality 2. Price | Open - Currently Some Foreign Procurement |
| | 1900 South Saunders Raleigh, NC 27602 | | | 290 | 90 | 60 | 30 | 30 | 10 | | | |
| 3. | Posi-Seal International Routes 49 and 95 North Stonington, CT 06359 203-599-1140 | A. Martin Purchasing Dept. | 3,680 Carbon 820 Corrosion | 2,190 \$1.50 570 \$3.70 | 960 \$1.50 170 \$3.70 | 370 \$1.50 60 \$3.70 | 110 | 50 | | | 1. Quality | Open - Currently Some Foreign Procurement |
| 4. | Jamesbury Corporation 640 Lincoln Street Worcester, MA 01613 617-852-0200 | D. J. Bucca Purchasing Dept. | 2,400 Carbon 1,640 Corrosion | 1,000 | 430 | 150 | 75 | 10 | | | 1. Quality 2. Price | Open - Currently Some Foreign Procurement |
| 5. | Xomox Corp. (Emerson Electric) 444 Cooper Cincinnati, OH 513-745-6000 | R. Stretch | 1,125 Carbon 1,190 Corrosion | 740 \$1.75 900 Ave \$3.75 | 260 \$1.75 200 Ave \$3.75 | 75 60 | 30 | 20 | | | 1. Quality 2. Price | Open - Currently Some Foreign Procurement |
| 6. | Fisher Controls International 205 South Center Marshalltown, IA 50158 515-754-3011 | R. B. Franklin | 2,620 Carbon 170 Corrosion | 2,050 | 570 | | | | | | 1. Quality 2. Price | Open - Currently Some Foreign Procurement |
| | 200 Main Street Coraopolis, PA 15108 | | | | | | | | | | | |
| | Highway 380 and Highway 5 McKinney, TX 75069 | | | | | | | | | | | |
| | U.S. Highway 75 Sherman, TX 75090 | | | | | | | | | | | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | Over 10,000 Lbs. | Purchasing Criteria | Foreign Supply Policies |
|--|--------------------------------|-------------------------------|--|-----------------|-------------------|---------------------|----------------------|------------------|------------------------|---|
| | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | |
| A. Valves and Fittings (Continued) | | | | | | | | | | |
| 7. Conval, Inc. | | | | | | | | | | |
| CDV Inc. 1106 North Main Orville, OH 44667 216-682-5060 | W. L. Stine | 2,960 Carbon 600 Corrosion | 1,040 | 1,175 | 370 | 150 | 150 | 75 | 1. Quality 2. Price | Open |
| Hammond Valve Corp. 1844 Summer Street Hammond, IN 46320 | | | 290 | 110 | 110 | 30 | 30 | 30 | | |
| Lunkenheimer Co. Bookman & Waverly Cincinnati, OH 54214 | A. Leatingi | | | | | | | | | |
| B. Mining Machinery | | | | | | | | | | |
| 1. Lake Shore Inc. 900 West Breitung Iron Mountain, MI 49855 906-774-1500 | D. Bruneau Purchasing Agent | 75 Carbon | 25 \$1.20 | 35 \$1.10 | | | 15 \$1.00 | | 1. Price | Open - Prefers Domestic |
| 2. Euclid Inc., Daimler Benz 2221 St. Clair Avenue Cleveland, OH 44117 216-383-5000 | A. Hogan Casting Buyer | 4,000 Carbon | 100 \$0.70 | 2,800 \$0.80 | 800 \$0.80 | 300 \$0.65 | | | 1. Quality 2. Price | Open |
| 3. Joy Manufacturing Co. 300 Fleming Road Birmingham, AL 35217 | | 600 Carbon 300 Corrosion | 300 | 200 | 100 | | | | 1. Quality 2. Price | None - Currently Some Foreign Procurement |
| 3790 Wheeling Denver, CO 80239 | | | | | | | | | | |
| River Road Claremont, NH 03743 | | | | | | | | | | |
| 120 Liberty Street Franklin, PA 16323 | | | | | | | | | | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | Purchasing Criteria | Foreign Supply Policies | |
|---|-----------------------------------|-------------------------------|--|-----------------|-------------------|---------------------|----------------------|------------------------|---|------------------|
| | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | Over 10,000 Lbs. |
| B. Mining Machinery (Continued) | | | | | | | | | | |
| 4. Owen Bucket - Division of Anvil Attachments, Inc. 10101 Brecksville Road Brecksville, OH 44141 216-526-1167 | | 410 Carbon | 100 \$1.30 | 250 \$1.10 | 30 \$1.00 | 30 \$0.80 | | 1. Price | Open | |
| 5. FMC Corporation 1201 Sixth Street, S.W. Cedar Rapids, IA 319-398-3200 | Mr. Lintz Purchasing Manager | 300 Carbon 300 Wear Resist | 100 50 | 150 200 | 50 50 | | | 1. Price | Open | |
| 6. Atlas Copco, Jarva Inc. 29195 Hall Street Cleveland, OH 44139 216-248-0166 | T. Dzurilla Manager Purchasing | 300 Carbon | 150 | 75 | 50 | 25 | | 1. Quality 2. Price | Preference Domestic, but No Policy | |
| 7. American Alloy Corp. 3000 East 87th Street Cleveland, OH 44104 | | 1,450 Carbon | 750 | 650 | 50 | | | 1. Price 2. Quality | Imports Approximately 90% Far East and South Africa | |
| C. Motors and Generators | | | | | | | | | | |
| 1. Babcock & Wilcox Co. Inc. 20 South Van Buren Barberton, OH 44203 216-753-4511 | E. P. Preseruk | 450 Carbon | | 300 \$1.20 | | 150 \$1.00 | | 1. Quality | Open | |
| 2. Magnetics International 5400 Durham Road Cleveland, OH 44137 216-662-8484 | E. Richard | 1,450 Carbon | 30 \$1.35 | 120 \$1.20 | 150 \$1.20 | 350 \$0.95 | 800 \$0.85 | 1. Price | Open | |
| 3. Allis Chalmers Corp. 1126 South 70th Street West Allis, WI 53214 414-475-2000 | R. George Casting Buyer | 1,500 Carbon | 1,500 | | | | | 1. Price | Imports When Price Is Competitive | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| | Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | Purchasing Criteria | Foreign Supply Policies | |
|---------------------------|---|---------------------------------------|---|--|--------------------|-------------------|---------------------|----------------------|-------------------------|---------------------------------------|------------------|
| | | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | Over 10,000 Lbs. |
| D. Furnaces and Ovens | | | | | | | | | | | |
| 1. | Surface Combustion Div. Midland-Ross Corp. 2375 Dorr Street Toledo, OH 43607 419-537-6176 | R. L. Woodruff Director Purchasing | 250 Heat Resist | 250 \$2.40 | | | | | 1. Price | Open | |
| 2. | Selas Corporation of America Limekiln Pike Dresher, PA 19025 215-646-6600 | Mr. Semmer Casting Buyer | 50 Carbon 200 Heat Resist | 50 \$1.20 200 \$2.40 | | | | | Price and Quality Equal | Open | |
| E. Construction Equipment | | | | | | | | | | | |
| 1. | Deere & Company 1100 13th Avenue East Moline, IL 61244 309-752-6310 | J. Prey | 3,500 Carbon 150 Corrosion 150 Wear Resist | 2,500 100 50 | 1,000 50 100 | | | | 1. Price 2. Quality | Present Imports Minimal | |
| 2. | Terex Corporation 5405 Darrow Road Hudson, OH 44236 216-655-5000 8500 Clinton Road Cleveland, OH 44144 | | 2,000 Carbon | 1,200 \$1.12 | 400 \$1.05 | 250 \$0.90 | 150 \$0.90 | | Price and Quality Equal | Has Imported - Not Current | |
| 3. | Fiat-Allis 3000 South 6th Street Springfield, IL 62703 217-789-3000 | B. Haighe Casting Buyer | 1,900 Carbon 500 Corrosion | 1,100 400 | 400 100 | 250 | 150 | | 1. Price 2. Quality | Imports South Africa as Cost Dictates | |
| 4. | Manitowac Co. Inc. 500 South 16th Street Manitowac, WI 54220 414-684-6621 | K. Svacina Casting Buyer | 2,800 Carbon | 800 | 800 | 800 | 400 | | 1. Price 2. Service | Open | |
| 5. | Warner & Swasey 406 Mill Avenue, S.W. New Philadelphia, OH 44663 216-339-2211 | D. Wittingham | 1,100 Carbon | 650 | 400 | 50 | | | Quality and Price Equal | Open | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | Over 10,000 Lbs. | Purchasing Criteria | Foreign Supply Policies |
|--|-------------------------------|----------------------------------|--|-----------------------|--------------------------------|---------------------|----------------------|------------------|-------------------------|--|
| | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | |
| E. Construction Equipment (Continued) | | | | | | | | | | |
| 6. Caterpillar Tractor Co. Aurora, IL Decatur, IL Joliet, IL Peoria, IL Milwaukee, WI York, PA | | 45,000 Carbon 800 Wear Resist | 12,000 100 | 20,000 500 | 9,600 200 | 3,400 | | | 1. Quality 2. Price | Open |
| 7. Gallion Mfg. (Dresser Ind.) South Street Gallion, OH 44833 419-468-4321 | W. Askino Purchasing Agent | 2,400 Carbon | 1,500 | 900 | | | | | Price and Quality Equal | Open |
| Dresser Industries Libertyville, IL | | | | | | | | | | |
| 8. Harnischfeger Corp. Box 554 Milwaukee, WI 53201 414-671-4400 | | 3,200 Carbon 800 Manganese | 300 500 \$1.40 | 1,00 200 \$1.40 | 800 \$0.90 100 \$1.40 | 800 \$0.90 | 300 \$0.80 | | 1. Quality | Open |
| Schiller Park, IL Cedar Rapids, IA Escanaba, MI Oak Creek, WI | | | | | | | | | | |
| F. Truck, Bus, Trailer, and Other Motor Vehicle | | | | | | | | | | |
| 1. White Motor, Volvo 842 East 79th Street Cleveland, OH 44103 216-431-2000 | F. Botek Purchasing Dept. | 4,000 Carbon | 3,200 \$1.30 | 800 \$1.00 | | | | | Quality and Price Equal | Currently Imports If Prices Acceptable |
| 2. Perfection Cobey-Harsco 320 South East Street Gallion, OH 44833 419-468-5212 | P. Metzger | 250 Carbon | 250 \$1.40 | | | | | | 1. Price | Open Volumes Too Low |
| 3. Dura Corp. - Dura/Weaver 4500 North Detroit Toledo, OH 43612 419-476-2201 | J. Reeves | 160 Carbon | 160 \$1.40 | | | | | | 1. Price | Open |

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DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| | <u>Market and Company</u> | <u>Contact and Position</u> | <u>Projected 1983 Demand Tons</u> | <u>Under 100 Lbs.</u> | <u>Casting Weight Ranges</u> | | | <u>Over 10,000 Lbs.</u> | <u>Purchasing Criteria</u> | <u>Foreign Supply Policies</u> |
|--|--|-----------------------------|-----------------------------------|-------------------------|---|------------------------------|-----------------------------|-------------------------|----------------------------|--------------------------------|
| | | | | | <u>Tons by Group and Purchase Costs</u> | <u>Where Available/Pound</u> | <u>5,001 to 10,000 Lbs.</u> | | | |
| | | | | | <u>101 to 500 Lbs.</u> | <u>501 to 1,000 Lbs.</u> | <u>1,001 to 5,000 Lbs.</u> | | | |
| <u>F. Truck, Bus, Trailer, and Other Motor Vehicle (Continued)</u> | | | | | | | | | | |
| 4. | International Harvester 2069 LaGonda Springfield, OH 45501 513-390-4000 | R. Potter | 4,500 Carbon | 3,200 | 650 | 650 | | | 1. Price | Currently Imports |
| 5. | Neway Div. - Lear Siegler 1950 Indianapolis Boulevard Muskegon, MI 49433 616-773-3271 | | 880 Carbon | 880 \$1.10 | | | | | 1. Price | Open |
| 6. | Rockwell International Knox, IN Winchester, KY Marysville, OH Newark, OH Newcastle, PA Oshkosh, WI | | 9,600 Carbon | 3,700 | 5,000 | 800 | 100 | | 1. Price 2. Quality | Imports as Required |
| <u>G. Machine Tools</u> | | | | | | | | | | |
| 1. | National Acme (Acme-Cleveland) 170 East 131st Street Cleveland, OH 44108 216-268-4200 | | 400 Carbon | 400 \$1.50 to \$2.20 | | | | | 1. Price 2. Quality | Open |
| <u>H. Special Industry Machinery</u> | | | | | | | | | | |
| 1. | Portage Machine Co. Inc. 1021 Sweetzer Avenue Akron, OH 44311 216-762-0211 | R. Suarez | 480 Carbon | 40 \$1.00 | 40 \$0.80 | | 400 \$0.60 | | 1. Quality 2. Price | Open |
| 2. | National Machinery Co. Grovesfield Street Tiffin, OH 44883 419-447-5211 | L. Baker | 440 Carbon | | | 40 \$1.00 | 400 \$0.90 | | 1. Price 2. Quality | Open |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | Purchasing Criteria | Foreign Supply Policies | |
|--|----------------------|----------------------------|--|-----------------|-------------------|---------------------|----------------------|---------------------|-------------------------------|------------------|
| | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | Over 10,000 Lbs. |
| I. Industrial Trucks | | | | | | | | | | |
| 1. Clark Equipment Co. 324 Dewey Buchanan, MI 49107 616-697-8000 | C. De Poy | 1,000 Carbon | 1,000 \$1.30 | | | | | | 1. Price | |
| 2. Hyster Company 1813 East Voorhees Danville, IL 61832 Highway 278E Salligent, AL 35586 2000 Kentville Road Kewanee, IL 61443 | | 900 Carbon | 900 \$1.30 | | | | | | Price and Quality Equal | |
| 3. Towmotor Corp. (Caterpillar) 7800 Tyler Boulevard Mentor, OH 44060 216-255-5611 | M. Burdett | 100 Carbon | 100 | | | | | | 1. Quality | |
| J. Mill Machinery | | | | | | | | | | |
| 1. Production Experts 4259 East 49th Street Cleveland, OH 44125 216-794-2121 | | 700 Carbon | | | | 50 \$0.60 | 150 \$0.60 | 500 \$0.60 | 1. Price | Open |
| 2. Republic Steel Corp. 3100 East 45th Street Cleveland, OH 44127 216-622-5000 | | 1,600 Carbon | 100 \$0.97 | 200 \$0.97 | 200 \$0.97 | 400 \$0.90 | 600 \$0.90 | 100 \$0.90 | 1. Quality 2. Price | Open |
| 3. E. W. Bliss (Gulf & Western) 430 South Ellsworth Salem, OH 44460 216-337-3445 | M. Carek | 2,300 Carbon | 50 \$1.10 | 50 \$0.95 | 100 \$0.85 | 500 \$0.85 | 1,000 \$0.65 | 600 \$0.65 | 1. Quality 2. Price | Open |
| 4. Pollack Co. 101 Andrews Avenue Youngstown, OH 44503 216-743-5155 | W. Hill | 610 Carbon | 10 \$0.90 | 50 \$0.90 | 50 \$0.90 | 200 \$0.90 | 300 \$0.90 | | 1. Quality | Open |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | | Over 10,000 Lbs. | Purchasing Criteria | Foreign Supply Policies |
|--|---|--|--|-----------------|-------------------|---------------------|----------------------|-----|------------------|------------------------|-------------------------|
| | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | | |
| | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | | |
| J. Mill Machinery (Continued) | | | | | | | | | | | |
| 5. Wean United 3805 Hendricks Road Youngstown, OH 44501 216-792-9011 | J. Owens | 2,000 Carbon | 100 | 200 | 200 | 1,400 | 100 | | | 1. Quality 2. Price | Open |
| 6. Armco, Inc. 912 Cheney Avenue Marion, OH 44302 614-383-4011 | | 700 Carbon | 40 | 100 | 100 | 160 | 200 | 100 | | 1. Price | Open |
| 7. Bethlehem Steel Corp. 701 East 3rd Street Bethlehem, PA 18016 U.S. Highway 12 Portage, IN 46368 Sparrows Point Road Baltimore, MD 21219 119 Walnut Johnstown, PA 15907 Front and Swatara Streets Steelton, PA 17113 | J. Walsh | 820 Carbon 200 Heat Resist | 10 40 | 10 100 | 40 60 | 110 | 250 | 400 | | 1. Quality | Open |
| 8. Jones & Laughlin Mill Street Aliquippa, PA 15001 412-578-6011 3 Gateway Center Pittsburgh, PA 15263 305 Gateway View Plaza Pittsburgh, PA 15219 | Mill Castings Piercer Point Castings | 1,500 Carbon Points Plugs Guide Shoes Peeler Shoes | 100 1,500 500 560 50 | 200 | 200 | 350 | 450 | 200 | | 1. Quality 2. Price | Open |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| Market and Company | Contact and Position | Projected 1983 Demand Tons | Under 100 Lbs. | Casting Weight Ranges | | | | | Over 10,000 Lbs. | Purchasing Criteria | Foreign Supply Policies |
|---|------------------------|-------------------------------|--|--|-------------------|---------------------|----------------------|-----------|------------------------|---------------------|-------------------------|
| | | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | | | | |
| J. Mill Machinery (Continued) | | | | | | | | | | | |
| 9. U.S. Steel | Mill Castings | 3,000 | 200 | 300 | 400 | 600 | 1,000 | 500 | 1. Quality 2. Price | Open | |
| Plant Locations: Johnstown, PA Fairless Hills, PA Oil City, PA Lorain, OH Canton, OH Masury, OH Gary, IN | Piercer Point Castings | Points | 3,000 \$1.00 1,000 \$1.50 1,000 \$1.50 100 \$1.50 | | | | | | | | |
| | | Plugs | | | | | | | | | |
| | | Guide Shoes | | | | | | | | | |
| | | Peeler Shoes | | | | | | | | | |
| K. Pumps | | | | | | | | | | | |
| 1. Commercial Shearing Inc. 1775 Logan Youngstown, OH 44501 216-746-8011 | R. Simons | 300 Carbon | 300 \$1.30 | | | | | | 1. Price | Open | |
| 2. Hyco Div. of Weatherhead Co. 1401 Jacobson Avenue Ashland, OH 44805 419-323-1593 | | 800 Carbon | 800 \$1.30 | | | | | | 1. Quality 2. Price | Open | |
| 3. Worthington Pump 10 Lower Westfield Road Holyoke, MA 01040 413-536-0600 | Mr. Kilrain | 1,400 Carbon 350 Corrosion | 100 | 200 40 | 400 100 | 300 150 | 300 50 | 100 10 | 1. Quality | Open | |
| 4. Goulds Pumps Inc. 240 Fall Street Seneca Falls, NY 13148 315-568-5881 | R. McKnight | 1,400 Carbon 350 Corrosion | 300 100 | 400 100 | 600 50 | 100 25 | | | 1. Quality | Open | |
| 5. Standard Pump Div. Ingersoll-Rand 1 Pump Place Allentown, PA 18105 215-776-6100 | | 1,750 Carbon 350 Corrosion | 75 15 | 400 50 | 800 150 | 400 100 | 75 25 | 10 | 1. Quality 2. Price | Open | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

STEEL CASTING CONSUMERS AND INTERVIEWS

| | Market and Company | Contact and Position | Projected 1983 Demand Tons | Casting Weight Ranges | | | | | | Purchasing Criteria | Foreign Supply Policies |
|----------------------|---|----------------------|-----------------------------|--|-----------------|-------------------|---------------------|----------------------|------------------|------------------------|-------------------------|
| | | | | Tons by Group and Purchase Costs Where Available/Pound | | | | | | | |
| | | | | Under 100 Lbs. | 101 to 500 Lbs. | 501 to 1,000 Lbs. | 1,001 to 5,000 Lbs. | 5,001 to 10,000 Lbs. | Over 10,000 Lbs. | | |
| K. Pumps (Continued) | | | | | | | | | | | |
| 6. | Dean Brothers Pumps Inc. 6040 Guion Road Post Office Box 68172 Indianapolis, IN 46268 317-293-2930 | Mr. Singleton | 210 Carbon 70 Corrosion | 100 | 110 | | | | | 1. Quality 2. Price | |
| 7. | Chempump Div. (Crane) Warrington Industrial Park Warrington, PA 18976 215-343-6000 | R. Siefken | 50 Carbon 20 Corrosion | 50 | | | | | | 1. Quality | |
| 8. | Deming Div. (Crane) 884 South Broadway Salem, OH 44460 216-337-7861 | Mr. Warren | 700 Carbon 210 Corrosion | 50 | 200 | 400 | 50 | | | 1. Quality | Open |
| L. Tanks - Military | | | | | | | | | | | |
| I. | General Dynamics 6000 - 17 Mile Road Detroit, MI 48231 175 East Street Eynon, PA 18403 1155 Buckeye Road Lima, OH 45804 | | 7,000 Low Alloy | 1,000 \$2.16 | | 1,200 \$2.00 | 1,800 \$2.00 | 3,000 \$2.00 | | 1. Quality | Open |

PROJECTED 1983 AND 1985 CARBON AND LOW ALLOY
STEEL CASTING DEMAND BY MARKET SEGMENT AND STATE

| Market | SIC | 1983 Annual Tons | Compounded Annual Growth 1983-1985 | Illinois | | Indiana | | Michigan | | Ohio | | Pennsylvania | | Wisconsin | | Other States Or Unidentified | | Total Tons | |
|----------------------------|---------|---------------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------------------|--------------|--------------|--------------|
| | | | | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 |
| Municipal and Construction | 1611 | | | | | | | | | | | | | | | | | | |
| Heating-Nonelectric | 3433 | | | 1,900 | 2,600 | 4,200 (1) | 5,700 | 700 | 1,000 | 18,200 (2) | 24,700 | 9,600 (3) | 13,100 | 2,600 | 3,500 | 32,800 | 44,400 | 70,000 | 95,000 |
| Boiler Products | 3443 | | | 650 | 650 | 2,800 | 2,800 | 2,100 | 2,100 | 500 | 500 | 3,800 | 3,800 | 400 | 400 | 7,750 | 7,750 | 18,000 | 18,000 |
| Valves and Fittings | 3494 | | | 1,500 | 1,500 | | | | | | | | | 500 | 500 | 3,000 | 3,000 | 5,000 | 5,000 |
| Engines and Turbines | 3511-19 | | | 64,600 | 79,400 | 8,200 | 10,000 | 9,800 | 11,900 | 17,800 | 21,800 | 10,800 | 13,200 | 24,200 | 29,700 | 20,600 | 26,000 | 156,000 | 192,000 |
| Farm Equipment | 3531 | | | 6,000 | 7,700 | 8,300 | 10,500 | 1,000 | 1,400 | 28,500 | 35,800 | 15,700 | 19,700 | 14,700 | 18,500 | 28,800 | 36,400 | 103,000 | 130,000 |
| Construction Equipment | 3532 | | | 100 | 150 | 100 | 150 | | | 700 | 850 | 2,000 | 2,200 | 100 | 150 | 31,000 | 34,000 | 34,000 | 37,500 |
| Mining Equipment | 3533 | | | 100 | 125 | | | 1,000 | 1,250 | 100 | 125 | 500 | 625 | | | 2,300 | 2,875 | 4,000 | 5,000 |
| Oil Field Equipment | 3537 | | | 100 | 100 | | | 1,200 | 1,200 | 700 | 700 | 400 | 400 | | | 1,500 | 1,500 | 3,000 | 3,000 |
| Industrial Trucks | 3541 | | | 100 | 100 | | | 350 | 350 | 13,500 | 14,000 | 9,500 | 9,900 | 500 | 550 | 7,200 | 7,500 | 36,000 | 37,500 |
| Machine Tools | 3544 | | | 100 | 100 | | | | | | | | | | | 10,000 | 11,500 | 10,000 | 11,500 |
| Tools and Dies | 3544 | | | 850 | 900 | 4,100 | 4,300 | | | | | | | | | 8,000 | 9,000 | 10,000 | 11,500 |
| Mill Machinery | 3547 | | | | | | | | | | | | | | | 3,040 | 4,400 | 10,000 | 14,400 |
| Metal Work Machinery | 3549 | | | | | | | | | | | | | | | | | | |
| Special Industry Machinery | 3559 | | | | | | | | | | | | | | | | | | |
| Pumps | 3561 | | | 410 | 600 | 450 | 650 | 50 | 80 | 2,240 | 3,200 | 3,770 (4) | 5,400 | 40 | 70 | | | 4,000 | 5,000 |
| Blowers and Fans | 3564 | | | | | | | | | | | | | | | 1,800 | 2,250 | | |
| Power Transmissions | 3566 | | | 600 | 750 | 800 | 1,000 | | | | | 200 | 250 | | | 2,700 | 2,970 | 5,000 | 5,500 |
| Furnaces and Ovens | 3567 | | | | | | | | | | | | | | | 30,500 | 33,000 | 116,000 | 125,000 |
| Motors and Generators | 3621 | | | 3,000 | 3,200 | 300 | 330 | | | 750 | 825 | 500 | 550 | 750 | 825 | 2,000 | 2,000 | 2,000 | 2,000 |
| Trucks, Buses, Trailers | 3713-15 | | | | | | | 45,000 | 48,500 | 28,000 | 30,000 | 2,000 | 2,100 | 5,000 | 5,500 | | | 436,000 | 518,000 |
| Shipbuilding | 373 | | | | | | | | | | | | | | | | | 7,000 | 7,700 |
| Railroad Equipment | 3743 | | | | | | | | | | | | | | | | | | |
| Tanks (Military) | 3795 | | | | | | | | | | | | | | | | | | |
| Other | | | | 2,200 | 2,266 | 880 | 880 | 1,000 | 1,100 | 2,000 | 2,200 | 2,000 | 2,200 | | | 436,000 | 518,000 | 7,000 | 7,700 |
| | | | | | | | | 1,727 | 1,806 | 3,146 | 3,145 | 1,672 | 1,705 | 1,375 | 1,408 | 13,000 | 18,000 | 24,000 | 29,000 |
| Totals | | 1,055,000 | | 82,110 | 100,041 | 32,630 | 39,010 | 64,327 | 70,886 | 117,136 | 138,835 | 62,442 | 75,130 | 51,065 | 62,153 | 645,290 | 768,045 | 1,055,000 | 1,254,100 |

Percent of Total Tons 92.3

- (1) Includes major Louisville, Kentucky consumer (Henry Vogt Machine Co.)
- (2) Includes major Cincinnati, Kentucky consumer (Ladiah Co.)
- (3) Includes two major New Jersey consumers (Walworth - Linden, New Jersey; Leslie Co. - Parsippany, New Jersey)
- (4) Includes major New York consumer (Goulds Pumps, Inc. - Seneca Falls, New York)

PROJECTED 1983 AND 1985 CORROSION RESISTANT
STEEL CASTING DEMAND BY MARKET SEGMENT AND STATE

| Market | SIC | 1983 Annual Tons | Compounded Annual Growth 1983-1985 | Illinois Tons 1983 1985 | Indiana Tons 1983 1985 | Michigan Tons 1983 1985 | Ohio Tons 1983 1985 | Pennsylvania Tons 1983 1985 | Wisconsin Tons 1983 1985 | Other States Or Unidentified Tons 1983 1985 | Total Tons Tons 1983 1985 |
|----------------------------|---------|---------------------|--|----------------------------------|---------------------------------|----------------------------------|------------------------------|--------------------------------------|-----------------------------------|---|------------------------------------|
| Municipal and Construction | 1611 | | | | | | | | | | |
| Heating-Nonelectric | 3433 | | | | | | | | | | |
| Boiler Products | 3403 | | | | | | | | | | |
| Valves and Fittings | 3484 | | | | | | | | | | |
| Engines and Turbines | 3511-19 | 17,000 | | | | | | | | | |
| Farm Equipment | 352 | 1,000 | 33.0 % Flat | 500 | 900 | | | | | | |
| Construction Equipment | 3531 | | | | | | | | | | |
| Mining Equipment | 3532 | | | | | | | | | | |
| Oil Field Equipment | 3533 | | | | | | | | | | |
| Industrial Trucks | 3537 | | | | | | | | | | |
| Machine Tools | 3541 | | | | | | | | | | |
| Tools and Dies | 3544 | | | | | | | | | | |
| Mill Machinery | 3547 | | | | | | | | | | |
| Metal Work Machinery | 3549 | | | | | | | | | | |
| Special Industry Machinery | 3559 | | | | | | | | | | |
| Pumps | 3561 | 5,000 | 7.0 % | 170 | 190 | 50 | 1,600 | 750 | 110 | 1,000 | 17,000 |
| Blowers and Fans | 3564 | 6,000 | 20.0 % | 280 | 290 | 40 | 420 | 1,400 (4) | 30 | 1,000 | 17,000 |
| Power Transmissions | 3566 | | | | | | | | | | |
| Furnaces and Ovens | 3567 | | | | | | | | | | |
| Motors and Generators | 3621 | | | | | | | | | | |
| Trucks, Buses, Trailers | 3713-15 | | | | | | | | | | |
| Shipbuilding | 373 | 2,000 | Flat | | | | | | | | |
| Railroad Equipment | 3743 | | | | | | | | | | |
| Tanks (Military) | 3795 | | | | | | | | | | |
| Other | | | | | | | | | | | |
| Totals | | 39,000 | 10.0 % | 1,300 | 1,600 | 40 | 1,100 | 725 | 75 | 3,800 | 72,000 |
| Percent of Total Tons | | 3.4 | | 1,060 | 1,640 | 280 | 8,320 | 5,475 | 615 | 22,150 | 39,000 |

(1) Includes major Louisville, Kentucky consumer (Henry Vogt Machine Co.)

(2) Includes major Cincinnati, Kentucky consumer (Ladish Co.)

(3) Includes two major New Jersey consumers (Walworth - Linden, New Jersey; Leslie Co. - Parsippany, New Jersey)

(4) Includes major New York consumer (Goulds Pumps, Inc. - Seneca Falls, New York)

PROJECTED 1983 AND 1985 HEAT RESISTANT
STEEL CASTING DEMAND BY MARKET SEGMENT AND STATE

| Market | SIC | 1983 Annual Tons | Compounded Annual Growth 1983-1985 | Illinois | | Indiana | | Michigan | | Ohio | | Pennsylvania | | Wisconsin | | Other States Or Unidentified | | Total Tons | |
|----------------------------|---------|---------------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------------------|--------------|--------------|--------------|
| | | | | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 | Tons 1983 | Tons 1985 |
| Municipal and Construction | 1611 | | | | | | | | | | | | | | | | | | |
| Heating-Nonelectric | 3433 | 1,000 | 5.0% | 40 | 40 | 45 | 45 | 15 | 15 | 120 | 120 | 185 | 195 | 35 | 35 | 560 | 650 | 1,000 | 1,100 |
| Boiler Products | 3443 | 1,000 | 5.0% | 150 | 175 | 50 | 50 | 30 | 30 | 150 | 160 | 145 | 160 | 55 | 55 | 420 | 470 | 1,000 | 1,100 |
| Valves and Fittings | 3494 | 1,000 | Flat | | | | | | | | | | | | | 1,000 | 1,000 | 1,000 | 1,000 |
| Engines and Turbines | 3511-19 | | | | | | | | | | | | | | | | | | |
| Farm Equipment | 352 | | | | | | | | | | | | | | | | | | |
| Construction Equipment | 3531 | | | | | | | | | | | | | | | | | | |
| Mining Equipment | 3532 | 2,000 | 12.0% | 300 | 400 | 50 | 60 | 80 | 120 | 500 | 600 | 150 | 200 | 420 | 520 | 500 | 600 | 2,000 | 2,500 |
| Oil Field Equipment | 3533 | 500 | 5.0% | | | | | | | | | | | | | 500 | 550 | 500 | 550 |
| Industrial Trucks | 3537 | | | | | | | | | | | | | | | | | | |
| Machine Tools | 3541 | 500 | Flat | | | | | 30 | 30 | 250 | 275 | 275 | 300 | 30 | 30 | 500 | 500 | 500 | 500 |
| Tools and Dies | 3544 | 1,000 | 2.0% | 70 | 70 | 85 | 85 | | | | | | | | | 260 | 260 | 1,000 | 1,050 |
| Mill Machinery | 3547 | | | | | | | 200 | 250 | 540 | 650 | 630 | 730 | 40 | 40 | 2,200 | 2,500 | 4,000 | 4,600 |
| Metal Work Machinery | 3549 | 4,000 | 7.0% | 320 | 360 | 70 | 70 | | | | | | | | | 500 | 500 | 500 | 500 |
| Special Industry Machinery | 3559 | | | | | | | | | | | | | | | | | | |
| Pumps | 3561 | 500 | Flat | | | | | | | | | | | | | | | | |
| Blowers and Fans | 3564 | | | | | | | | | | | | | | | | | | |
| Power Transmissions | 3566 | | | | | | | | | | | | | | | | | | |
| Furnaces and Ovens | 3567 | 7,000 | 2.0% | 750 | 780 | 530 | 550 | 550 | 570 | 1,470 | 1,540 | 1,190 | 1,250 | 270 | 280 | 2,240 | 2,330 | 7,000 | 7,300 |
| Motors and Generators | 3621 | | | | | | | | | | | | | | | | | | |
| Trucks, Buses, Trailers | 3713-15 | | | | | | | | | | | | | | | | | | |
| Shipbuilding | 373 | | | | | | | | | | | | | | | | | | |
| Railroad Equipment | 3743 | | | | | | | | | | | | | | | | | | |
| Tanks (Military) | 3795 | | | | | | | | | | | | | | | | | | |
| Other | | 2,000 | 10.0% | 175 | 200 | 75 | 95 | 100 | 115 | 350 | 370 | 275 | 315 | 75 | 105 | 950 | 1,200 | 2,000 | 2,400 |
| Totals | | 20,500 | | 1,805 | 2,025 | 905 | 955 | 1,005 | 1,130 | 3,380 | 3,715 | 2,850 | 3,150 | 925 | 1,065 | 9,630 | 10,560 | 20,500 | 22,600 |

Percent of Total Tons 1.8

PROJECTED 1983 AND 1985 MANGANESE AND WEAR RESISTANT ALLOYS
STEEL CASTING DEMAND BY MARKET SEGMENT AND STATE

| Market | SIC | 1983 Annual Tons | Compound Annual Growth 1983-1985 | Illinois Tons 1983 | Illinois Tons 1985 | Indiana Tons 1983 | Indiana Tons 1985 | Michigan Tons 1983 | Michigan Tons 1985 | Ohio Tons 1983 | Ohio Tons 1985 | Pennsylvania Tons 1983 | Pennsylvania Tons 1985 | Wisconsin Tons 1983 | Wisconsin Tons 1985 | Other States Or Unidentified Tons 1983 | Other States Or Unidentified Tons 1985 | Total Tons Tons 1983 | Total Tons Tons 1985 |
|----------------------------|---------|---------------------|--|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|----------------------|----------------------|------------------------------|------------------------------|---------------------------|---------------------------|---|---|----------------------------|----------------------------|
| Municipal and Construction | 1611 | | | | | | | | | | | | | | | | | | |
| Heating-Nonelectric | 3433 | | | | | | | | | | | | | | | | | | |
| Boiler Products | 3443 | | | | | | | | | | | | | | | | | | |
| Valves and Fittings | 3494 | | | | | | | | | | | | | | | | | | |
| Engines and Turbines | 3511-19 | | | | | | | | | | | | | | | | | | |
| Farm Equipment | 352 | | | | | | | | | | | | | | | | | | |
| Construction Equipment | 3531 | 3,000 | 11.0% | 400 | 490 | | | | | | | | | | | | | | |
| Mining Equipment | 3532 | 10,000 | 12.0% | 120 | 200 | 160 | 200 | | | 300 | 370 | 200 | 250 | 1,100 | 1,350 | 1,000 | 1,240 | 3,000 | 3,700 |
| Oil Field Equipment | 3533 | | | | | | | | | 560 | 700 | 300 | 400 | 280 | 400 | 8,580 | 10,600 | 10,000 | 12,500 |
| Industrial Trucks | 3537 | | | | | | | | | | | | | | | | | | |
| Machine Tools | 3541 | | | | | | | | | | | | | | | | | | |
| Tools and Dies | 3544 | | | | | | | | | | | | | | | | | | |
| Mill Machinery | 3547 | | | | | | | | | | | | | | | | | | |
| Metal Work Machinery | 3549 | | | | | | | | | | | | | | | | | | |
| Special Industry Machinery | 3559 | 2,000 | 7.0% | | | | | | | | | | | | | 2,000 | 2,300 | 2,000 | 2,300 |
| Pumps | 3561 | | | | | | | | | | | | | | | | | | |
| Blowers and Fans | 3564 | | | | | | | | | | | | | | | | | | |
| Power Transmissions | 3566 | | | | | | | | | | | | | | | | | | |
| Furnaces and Ovens | 3567 | | | | | | | | | | | | | | | | | | |
| Motors and Generators | 3621 | | | | | | | | | | | | | | | | | | |
| Trucks, Buses, Trailers | 3713-15 | | | | | | | | | | | | | | | | | | |
| Shipbuilding | 373 | 10,000 | 9.0% | | | | | | | | | | | | | 10,000 | 12,000 | 10,000 | 12,000 |
| Railroad Equipment | 3743 | 3,000 | 10.0% | 150 | 170 | 50 | 50 | | | 250 | 270 | 150 | 160 | 400 | 450 | 2,000 | 2,500 | 3,000 | 3,600 |
| Tanks (Military) | 3795 | | | 670 | 860 | 210 | 250 | | | 1,110 | 1,340 | 650 | 810 | 1,780 | 2,200 | 23,580 | 28,640 | 28,000 | 34,100 |
| Other | | 28,000 | | | | | | | | | | | | | | | | | |
| Totals | | | | | | | | | | | | | | | | | | | |
| Percent of Total Tons | | 2.5 | | | | | | | | | | | | | | | | | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Illinois

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 1,456 | 468 | 234 | 182 | 208 | 52 | 2,600 |
| Engines and Turbines | 33 | 32 | 65 | 33 | 97 | 390 | 650 |
| Farm Equipment | 435 | 600 | 330 | 120 | 15 | - | 1,500 |
| Construction Equipment | 23,026 | 31,760 | 17,468 | 6,352 | 794 | - | 79,400 |
| Mining Equipment | 6,468 | 1,232 | - | - | - | - | 7,700 |
| Oil Field Equipment | 45 | 60 | 30 | 12 | 3 | - | 150 |
| Industrial Trucks | 113 | 12 | - | - | - | - | 125 |
| Machine Tools | 26 | 3 | 35 | 10 | 15 | 11 | 100 |
| Tools and Dies | 40 | 40 | 10 | 5 | 5 | - | 100 |
| Mill Machinery | 450 | 45 | 54 | 81 | 135 | 135 | 900 |
| Pumps | 336 | 132 | 132 | - | - | - | 600 |
| Power Transmissions | 300 | 225 | 150 | 38 | 37 | - | 750 |
| Motors and Generators | - | - | - | - | - | - | - |
| Trucks, Buses, Trailers | 1,440 | 1,440 | 320 | - | - | - | 3,200 |
| Tanks | - | - | - | - | - | - | - |
| Other | <u>680</u> | <u>906</u> | <u>453</u> | <u>159</u> | <u>45</u> | <u>23</u> | <u>2,266</u> |
| Total | 34,848 | 36,955 | 19,281 | 6,992 | 1,354 | 611 | 100,041 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Indiana

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 2,679 | 1,824 | 627 | 285 | 228 | 57 | 5,700 |
| Engines and Turbines | 140 | 140 | 280 | 140 | 420 | 1,680 | 2,800 |
| Farm Equipment | - | - | - | - | - | - | - |
| Construction Equipment | 2,500 | 4,000 | 2,000 | 1,000 | 500 | - | 10,000 |
| Mining Equipment | 3,465 | 4,725 | 2,310 | - | - | - | 10,500 |
| Oil Field Equipment | 45 | 60 | 30 | 12 | 3 | - | 150 |
| Industrial Trucks | - | - | - | - | - | - | - |
| Machine Tools | - | - | - | - | - | - | - |
| Tools and Dies | - | - | - | - | - | - | - |
| Mill Machinery | 2,150 | 215 | 258 | 387 | 645 | 645 | 4,300 |
| Pumps | 293 | 312 | 45 | - | - | - | 650 |
| Power Transmissions | 1,000 | - | - | - | - | - | 1,000 |
| Motors and Generators | 135 | 36 | 17 | 45 | 97 | - | 330 |
| Trucks, Buses, Trailers | 2,700 | - | - | - | - | - | 2,700 |
| Tanks | - | - | - | - | - | - | - |
| Other | <u>264</u> | <u>352</u> | <u>176</u> | <u>62</u> | <u>17</u> | <u>9</u> | <u>880</u> |
| Total | 15,371 | 11,664 | 5,743 | 1,931 | 1,910 | 2,391 | 39,010 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Michigan

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 470 | 320 | 110 | 50 | 40 | 10 | 1,000 |
| Engines and Turbines | 105 | 105 | 210 | 105 | 315 | 1,260 | 2,100 |
| Farm Equipment | - | - | - | - | - | - | - |
| Construction Equipment | 4,760 | 4,760 | 2,380 | - | - | - | 11,900 |
| Mining Equipment | 462 | 644 | - | - | 294 | - | 1,400 |
| Oil Field Equipment | - | - | - | - | - | - | - |
| Industrial Trucks | 1,125 | 125 | - | - | - | - | 1,250 |
| Machine Tools | 104 | 12 | 140 | 40 | 60 | 44 | 400 |
| Tools and Dies | 480 | 480 | 120 | 60 | 60 | - | 1,200 |
| Mill Machinery | 175 | 18 | 21 | 31 | 53 | 52 | 350 |
| Pumps | 80 | - | - | - | - | - | 80 |
| Power Transmissions | - | - | - | - | - | - | - |
| Motors and Generators | - | - | - | - | - | - | - |
| Trucks, Buses, Trailers | 21,340 | 20,855 | 6,305 | - | - | - | 48,500 |
| Tanks | 154 | - | 187 | 286 | 473 | - | 1,100 |
| Other | <u>482</u> | <u>642</u> | <u>321</u> | <u>112</u> | <u>32</u> | <u>17</u> | <u>1,606</u> |
| Total | 29,737 | 27,961 | 9,794 | 684 | 1,327 | 1,383 | 70,886 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Ohio

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 13,338 | 6,175 | 2,964 | 1,235 | 741 | 247 | 24,700 |
| Engines and Turbines | 25 | 25 | 50 | 25 | 75 | 300 | 500 |
| Farm Equipment | - | - | - | - | - | - | - |
| Construction Equipment | 14,170 | 5,886 | 1,090 | 654 | - | - | 21,800 |
| Mining Equipment | 5,012 | 20,764 | 5,728 | 4,296 | - | - | 35,800 |
| Oil Field Equipment | 255 | 340 | 170 | 68 | 17 | - | 850 |
| Industrial Trucks | 113 | 12 | - | - | - | - | 125 |
| Machine Tools | 182 | 21 | 245 | 70 | 105 | 77 | 700 |
| Tools and Dies | 400 | 400 | 100 | 50 | 50 | - | 1,000 |
| Mill Machinery | 3,360 | 840 | 980 | 3,640 | 3,360 | 1,820 | 14,000 |
| Pumps | 2,016 | 416 | 672 | 96 | - | - | 3,200 |
| Power Transmissions | - | - | - | - | - | - | - |
| Motors and Generators | 330 | 91 | 42 | 115 | 248 | - | 825 |
| Trucks, Buses, Trailers | 19,200 | 9,000 | 1,500 | 300 | - | - | 30,000 |
| Tanks | 308 | - | 374 | 572 | 946 | - | 2,200 |
| Other | <u>941</u> | <u>1,254</u> | <u>627</u> | <u>219</u> | <u>63</u> | <u>31</u> | <u>3,135</u> |
| Total | 59,650 | 45,224 | 14,541 | 11,340 | 5,605 | 2,475 | 138,835 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Pennsylvania

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 7,991 | 2,751 | 655 | 786 | 524 | 393 | 13,100 |
| Engines and Turbines | 190 | 190 | 380 | 190 | 570 | 2,280 | 3,800 |
| Farm Equipment | - | - | - | - | - | - | - |
| Construction Equipment | 2,640 | 8,580 | 1,980 | - | - | - | 13,200 |
| Mining Equipment | 10,638 | 6,304 | 2,758 | - | - | - | 19,700 |
| Oil Field Equipment | 660 | 880 | 440 | 176 | 44 | - | 2,200 |
| Industrial Trucks | 562 | 63 | - | - | - | - | 625 |
| Machine Tools | - | - | - | - | - | - | - |
| Tools and Dies | 160 | 160 | 40 | 20 | 20 | - | 400 |
| Mill Machinery | 5,643 | 297 | 297 | 693 | 891 | 2,079 | 9,900 |
| Pumps | 810 | 1,566 | 2,754 | 270 | - | - | 5,400 |
| Power Transmissions | 100 | 75 | 50 | 13 | 12 | - | 250 |
| Motors and Generators | 220 | 61 | 27 | 77 | 165 | - | 550 |
| Trucks, Buses, Trailers | 2,100 | - | - | - | - | - | 2,100 |
| Tanks | 308 | - | 374 | 572 | 946 | - | 2,200 |
| Other | <u>512</u> | <u>682</u> | <u>341</u> | <u>119</u> | <u>34</u> | <u>17</u> | <u>1,705</u> |
| Total | 32,534 | 21,609 | 10,096 | 2,916 | 3,206 | 4,769 | 75,130 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CARBON STEEL AND LOW ALLOY STEEL DEMAND BY CASTING
WEIGHT RANGES - 1985
(Non-Railroad)

Wisconsin

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|----------------------------|--------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100 lbs</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 1,750 | 875 | 560 | 210 | 105 | - | 3,500 |
| Engines and Turbines | 20 | 20 | 40 | 20 | 60 | 240 | 400 |
| Farm Equipment | 145 | 200 | 110 | 40 | 5 | - | 500 |
| Construction Equipment | 5,940 | 9,207 | 6,237 | 6,237 | 2,079 | - | 29,700 |
| Mining Equipment | 3,330 | 7,585 | 2,960 | 2,035 | 1,295 | 1,295 | 18,500 |
| Oil Field Equipment | 45 | 60 | 30 | 12 | 3 | - | 150 |
| Industrial Trucks | - | - | - | - | - | - | - |
| Machine Tools | 78 | 9 | 105 | 30 | 45 | 33 | 300 |
| Tools and Dies | - | - | - | - | - | - | - |
| Mill Machinery | 275 | 28 | 33 | 50 | 82 | 82 | 550 |
| Pumps | 70 | - | - | -- | - | - | - |
| Power Transmissions | 300 | 225 | 150 | 38 | 37 | - | 750 |
| Motors and Generators | 330 | 91 | 41 | 116 | 247 | - | 825 |
| Trucks, Buses, Trailers | 2,475 | 2,475 | 550 | - | - | - | 5,500 |
| Tanks | - | - | - | -- | - | - | - |
| Other | <u>422</u> | <u>563</u> | <u>282</u> | <u>99</u> | <u>28</u> | <u>14</u> | <u>1,408</u> |
| Total | 15,180 | 21,338 | 11,098 | 8,887 | 3,986 | 1,664 | 62,153 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Illinois

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 432 | 234 | 117 | 45 | 45 | 27 | 900 |
| Special Industry Machines | 95 | 30 | 16 | 12 | 14 | 3 | 170 |
| Pumps | 112 | 144 | 144 | - | - | - | 400 |
| Other | <u>48</u> | <u>48</u> | <u>31</u> | <u>16</u> | <u>9</u> | <u>8</u> | <u>160</u> |
| Total | 687 | 456 | 308 | 73 | 68 | 38 | 1,630 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Indiana

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 620 | 130 | 130 | 40 | 40 | 40 | 1,000 |
| Special Industry Machines | 119 | 25 | 25 | 8 | 7 | 6 | 190 |
| Pumps | 139 | 122 | 29 | - | - | - | 290 |
| Other | <u>48</u> | <u>47</u> | <u>32</u> | <u>16</u> | <u>9</u> | <u>8</u> | <u>160</u> |
| Total | 926 | 324 | 216 | 64 | 56 | 54 | 1,640 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Michigan

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 186 | 39 | 39 | 12 | 12 | 12 | 300 |
| Special Industry Machines | 60 | - | - | - | - | - | 60 |
| Pumps | 60 | - | - | - | - | - | 60 |
| Other | <u>22</u> | <u>11</u> | <u>7</u> | <u>5</u> | <u>3</u> | <u>2</u> | <u>50</u> |
| Total | 328 | 50 | 46 | 17 | 15 | 14 | 470 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Ohio

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 5,704 | 2,116 | 828 | 276 | 184 | 92 | 9,200 |
| Special Industry Machines | 1,085 | 402 | 158 | 52 | 35 | 18 | 1,750 |
| Pumps | 72 | 390 | 138 | - | - | - | 600 |
| Other | <u>374</u> | <u>374</u> | <u>251</u> | <u>128</u> | <u>62</u> | <u>61</u> | <u>171</u> |
| Total | 7,235 | 3,282 | 1,375 | 456 | 281 | 171 | 12,800 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Pennsylvania

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 2,714 | 1,150 | 414 | 138 | 92 | 92 | 4,600 |
| Special Industry Machines | 515 | 218 | 79 | 26 | 18 | 17 | 873 |
| Pumps | 380 | 620 | 560 | 340 | 80 | 20 | 2,000 |
| Other | <u>248</u> | <u>248</u> | <u>165</u> | <u>83</u> | <u>42</u> | <u>41</u> | <u>827</u> |
| Total | 3,857 | 2,236 | 1,218 | 587 | 232 | 170 | 8,300 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CORROSION RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Wisconsin

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Valves and Fittings | 308 | 280 | 63 | 21 | 14 | 14 | 700 |
| Special Industry Machines | 59 | 50 | 12 | 4 | 3 | 2 | 130 |
| Pumps | 50 | - | - | - | - | - | 50 |
| Other | <u>28</u> | <u>20</u> | <u>14</u> | <u>9</u> | <u>5</u> | <u>4</u> | <u>80</u> |
| Total | 445 | 350 | 89 | 34 | 22 | 20 | 960 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Illinois

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 32 | 8 | - | - | - | - | 40 |
| Boiler Products | 140 | 35 | - | - | - | - | 175 |
| Mining Equipment | 320 | 80 | - | - | - | - | 400 |
| Mill Machinery | 56 | 14 | - | - | - | - | 70 |
| Special Industry Machines | 252 | 108 | - | - | - | - | 360 |
| Furnaces and Ovens | 624 | 156 | - | - | - | - | 780 |
| Other | <u>100</u> | <u>60</u> | <u>20</u> | <u>20</u> | <u>-</u> | <u>-</u> | <u>200</u> |
| Total | 1,524 | 461 | 20 | 20 | - | - | 2,025 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Indiana

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 36 | 9 | - | - | - | - | 45 |
| Boiler Products | 40 | 10 | - | - | - | - | 50 |
| Mining Equipment | 48 | 12 | - | - | - | - | 60 |
| Mill Machinery | 68 | 17 | - | - | - | - | 85 |
| Special Industry Machines | 49 | 21 | - | - | - | - | 70 |
| Furnaces and Ovens | 440 | 110 | - | - | - | - | 550 |
| Other | <u>48</u> | <u>28</u> | <u>10</u> | <u>9</u> | <u>-</u> | <u>-</u> | <u>95</u> |
| Total | 729 | 207 | 10 | 9 | - | - | 955 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Michigan

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 2 | 3 | - | - | - | - | 15 |
| Boiler Products | 24 | 6 | - | - | - | - | 30 |
| Mining Equipment | 96 | 24 | - | - | - | - | 120 |
| Mill Machinery | 24 | 6 | - | - | - | - | 30 |
| Special Industry Machines | 175 | 75 | - | - | - | - | 250 |
| Furnaces and Ovens | 456 | 114 | - | - | - | - | 570 |
| Other | <u>58</u> | <u>38</u> | <u>12</u> | <u>11</u> | <u>-</u> | <u>-</u> | <u>115</u> |
| Total | 845 | 262 | 12 | 11 | - | - | 1,130 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Ohio

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 96 | 24 | - | - | - | - | 120 |
| Boiler Products | 120 | 40 | - | - | - | - | 160 |
| Mining Equipment | 480 | 120 | - | - | - | - | 600 |
| Mill Machinery | 220 | 55 | - | - | - | - | 275 |
| Special Industry Machines | 455 | 195 | - | - | - | - | 650 |
| Furnaces and Ovens | 1,232 | 308 | - | - | - | - | 1,540 |
| Other | <u>185</u> | <u>111</u> | <u>37</u> | <u>37</u> | <u>-</u> | <u>-</u> | <u>370</u> |
| Total | 2,788 | 853 | 37 | 37 | - | - | 3,715 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Pennsylvania

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 156 | 39 | - | - | - | - | 195 |
| Boiler Products | 128 | 32 | - | - | - | - | 160 |
| Mining Equipment | 160 | 40 | - | - | - | - | 200 |
| Mill Machinery | 240 | 60 | - | - | - | - | 300 |
| Special Industry Machines | 511 | 219 | - | - | - | - | 730 |
| Furnaces and Ovens | 1,000 | 250 | - | - | - | - | 1,250 |
| Other | <u>157</u> | <u>95</u> | <u>32</u> | <u>31</u> | <u>-</u> | <u>-</u> | <u>315</u> |
| Total | 2,352 | 735 | 32 | 31 | - | - | 3,150 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Wisconsin

| <u>Major Markets</u> | <u>Tons of Castings</u> | | | | | | <u>Total</u> |
|------------------------------|-------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Heating-Nonelectric | 28 | 7 | - | - | - | - | 35 |
| Boiler Products | 44 | 11 | - | - | - | - | 55 |
| Mining Equipment | 416 | 104 | - | - | - | - | 520 |
| Mill Machinery | 24 | 6 | - | - | - | - | 30 |
| Special Industry Machines | 28 | 12 | - | - | - | - | 40 |
| Furnaces and Ovens | 224 | 56 | - | - | - | - | 280 |
| Other | <u>53</u> | <u>32</u> | <u>10</u> | <u>10</u> | <u>-</u> | <u>-</u> | <u>105</u> |
| Total | 817 | 228 | 10 | 10 | - | - | 1,065 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MANGANESE STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Illinois

| <u>Major Markets</u> | <u>Tons of Steel Castings</u> | | | | | | <u>Total</u> |
|---------------------------|-------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Construction Equipment | 64 | 299 | 127 | - | - | - | 490 |
| Mining Equipment | 26 | 122 | 52 | - | - | - | 200 |
| Other | <u>51</u> | <u>49</u> | <u>35</u> | <u>18</u> | <u>17</u> | <u>-</u> | <u>170</u> |
| Total | 141 | 470 | 214 | 18 | 17 | - | 860 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MANGANESE STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Indiana

| <u>Major Markets</u> | <u>Tons of Steel Castings</u> | | | | | | <u>Total</u> |
|---------------------------|-------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Construction Equipment | - | - | - | - | - | - | - |
| Mining Equipment | 26 | 122 | 52 | - | - | - | 200 |
| Other | <u>15</u> | <u>15</u> | <u>10</u> | <u>5</u> | <u>5</u> | <u>-</u> | <u>50</u> |
| Total | 41 | 137 | 62 | 5 | 5 | - | 250 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MANGANESE STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Ohio

| <u>Major Markets</u> | <u>Tons of Steel Castings</u> | | | | | | <u>Total</u> |
|---------------------------|-------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Construction Equipment | 48 | 226 | 96 | - | - | - | 370 |
| Mining Equipment | 91 | 427 | 182 | - | - | - | 700 |
| Other | <u>81</u> | <u>81</u> | <u>54</u> | <u>27</u> | <u>27</u> | <u>-</u> | <u>270</u> |
| Total | 220 | 734 | 332 | 27 | 27 | - | 1,340 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MANGANESE STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Pennsylvania

| <u>Major Markets</u> | <u>Tons of Steel Castings</u> | | | | | | <u>Total</u> |
|---------------------------|-------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Construction Equipment | 33 | 152 | 65 | - | - | - | 250 |
| Mining Equipment | 52 | 224 | 104 | - | - | - | 400 |
| Other | <u>48</u> | <u>46</u> | <u>33</u> | <u>17</u> | <u>16</u> | <u>-</u> | <u>160</u> |
| Total | 133 | 442 | 202 | 17 | 16 | - | 810 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MANGANESE STEEL DEMAND BY CASTING WEIGHT RANGES - 1985
(Non-Railroad)

Wisconsin

| <u>Major Markets</u> | <u>Tons of Steel Castings</u> | | | | | | <u>Total</u> |
|---------------------------|-------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Construction Equipment | 810 | 405 | 135 | - | - | - | 1,350 |
| Mining Equipment | 240 | 120 | 40 | - | - | - | 400 |
| Other | <u>138</u> | <u>135</u> | <u>88</u> | <u>45</u> | <u>44</u> | <u>-</u> | <u>450</u> |
| Total | 1,188 | 660 | 263 | 45 | 44 | - | 2,200 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

GENERAL STATUS OF CARBON STEEL CASTINGS MARKET
BY WEIGHT RANGE - 1985
(Non-Railroad)

| <u>States</u> | <u>(000) Tons of Castings Demand</u> | | | | | | <u>Total</u> |
|---|--------------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Illinois | 34.7 | 37.0 | 19.2 | 7.1 | 1.4 | 0.6 | 100.0 |
| Indiana | 15.3 | 11.7 | 5.7 | 2.0 | 1.9 | 2.4 | 39.0 |
| Michigan | 29.7 | 28.0 | 9.8 | 0.7 | 1.3 | 1.4 | 70.9 |
| Ohio | 59.7 | 45.2 | 14.5 | 11.3 | 5.6 | 2.5 | 138.8 |
| Pennsylvania | 32.5 | 21.6 | 10.1 | 2.9 | 3.2 | 4.8 | 75.1 |
| Wisconsin | <u>15.2</u> | <u>21.3</u> | <u>11.1</u> | <u>8.9</u> | <u>4.0</u> | <u>1.7</u> | <u>62.2</u> |
| Six-State Total | 187.1 | 164.8 | 70.4 | 32.9 | 17.4 | 13.4 | 486.0 |
| Demand/Supply Ratio | .88 | .90 | .90 | .95 | 1.05 | 1.10 | |
| Average 1983 Selling Price/Pound | \$1.10 | \$1.00 | \$0.95 | \$0.90 | \$0.90 | \$0.88 | |
| Average 1983 Pro- ductivity Rate in Man-Hours per Ton | 50 | 45 | 55 | 55 | 60 | 70 | |
| Average 1983 Hour- ly Labor Rate Including Fringes | \$11.80 | \$11.70 | \$11.50 | \$11.40 | \$11.20 | \$11.00 | |
| Projected 1985 Import Tons (000) | 45.0 | 39.0 | 17.0 | 8.0 | 4.0 | 3.0 | |

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

GENERAL STATUS OF CORROSION RESISTANT STEEL CASTINGS MARKET
BY WEIGHT RANGE - 1985
(Non-Railroad)

| <u>States</u> | <u>(000) Tons of Castings Demand</u> | | | | | | <u>Total</u> |
|---|--------------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Illinois | 0.69 | 0.46 | 0.31 | 0.07 | 0.07 | 0.04 | 1.64 |
| Indiana | 0.92 | 0.33 | 0.22 | 0.06 | 0.06 | 0.05 | 1.64 |
| Michigan | 0.31 | 0.05 | 0.05 | 0.02 | 0.02 | 0.01 | 0.46 |
| Ohio | 7.23 | 3.28 | 1.37 | 0.45 | 0.28 | 0.17 | 12.78 |
| Pennsylvania | 3.86 | 2.24 | 1.22 | 0.58 | 0.23 | 0.17 | 8.30 |
| Wisconsin | <u>0.45</u> | <u>0.36</u> | <u>0.10</u> | <u>0.03</u> | <u>0.02</u> | <u>0.02</u> | <u>0.98</u> |
| Six-State Total | 13.46 | 6.72 | 3.27 | 1.21 | 0.68 | 0.46 | 25.80 |
| Demand/Supply Ratio | .90 | .93 | .96 | 1.00 | 1.05 | 1.10 | |
| Average 1983 Selling Price/Pound | \$3.70 | \$3.50 | \$3.30 | \$3.20 | \$3.20 | \$3.20 | |
| Average 1983 Pro- ductivity Rate in Man-Hours per Ton | 150 | 140 | 140 | 150 | 150 | 170 | |
| Average 1983 Hour- ly Labor Rate Including Fringes | \$11.80 | \$11.70 | \$11.50 | \$11.40 | \$11.20 | \$11.00 | |
| Projected 1985 Import Tons (000) | 2.8 | 1.4 | 0.7 | 0.3 | 0.1 | 0.1 | |

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

GENERAL STATUS OF HEAT RESISTANT STEEL CASTINGS MARKET
BY WEIGHT RANGE - 1985
(Non-Railroad)

| <u>States</u> | <u>(000) Tons of Castings Demand</u> | | | | | | <u>Total</u> |
|---|--------------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Illinois | 1.53 | 0.46 | 0.02 | 0.02 | - | - | 2.03 |
| Indiana | 0.73 | 0.21 | 0.01 | 0.01 | - | - | 0.96 |
| Michigan | 0.84 | 0.26 | 0.01 | 0.01 | - | - | 1.12 |
| Ohio | 2.79 | 0.85 | 0.04 | 0.04 | - | - | 3.72 |
| Pennsylvania | 2.35 | 0.74 | 0.03 | 0.03 | - | - | 3.15 |
| Wisconsin | <u>0.82</u> | <u>0.23</u> | <u>0.01</u> | <u>0.01</u> | <u>-</u> | <u>-</u> | <u>1.07</u> |
| Six-State Total | 9.06 | 2.75 | 0.12 | 0.12 | - | - | 12.05 |
| Demand/Supply Ratio | .95 | .95 | .95 | .95 | - | - | |
| Average 1983 Selling Price/Pound | \$2.90 | \$2.80 | \$2.80 | \$2.70 | - | - | |
| Average 1983 Pro- ductivity Rate in Man-Hours per Ton | 140 | 120 | 120 | 130 | - | - | |
| Average 1983 Hour- ly Labor Rate Including Fringes | \$11.80 | \$11.70 | \$11.50 | \$11.40 | \$11.20 | \$11.00 | |
| Projected 1985 Import Tons (000) | 1.8 | 0.4 | - | - | - | - | |

Note: All data relative to the subject six-state region. Captive supply of Heat Resistant steel castings in this region is negligible.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

GENERAL STATUS OF MANGANESE STEEL CASTINGS MARKET
BY WEIGHT RANGE - 1985
(Non-Railroad)

| <u>States</u> | <u>(000) Tons of Castings Demand</u> | | | | | | <u>Total</u> |
|---|--------------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | |
| Illinois | 0.14 | 0.47 | 0.21 | 0.02 | 0.02 | - | 0.86 |
| Indiana | 0.04 | 0.14 | 0.05 | 0.01 | 0.01 | - | 0.25 |
| Michigan | - | - | - | - | - | - | - |
| Ohio | 0.22 | 0.73 | 0.33 | 0.03 | 0.03 | - | 1.34 |
| Pennsylvania | 0.13 | 0.45 | 0.20 | 0.02 | 0.01 | - | 0.81 |
| Wisconsin | <u>1.18</u> | <u>0.66</u> | <u>0.26</u> | <u>0.05</u> | <u>0.04</u> | <u>-</u> | <u>2.19</u> |
| Six-State Total | 1.71 | 2.45 | 1.05 | 0.13 | 0.11 | - | 5.45 |
| Demand/Supply Ratio | .95 | .95 | 1.00 | 1.00 | 1.00 | | |
| Average 1983 Selling Price/Pound | \$2.40 | \$2.30 | \$2.15 | NA | NA | | |
| Average 1983 Productivity Rate in Man-Hours per Ton | 120 | 110 | 110 | NA | NA | | |
| Average 1983 Hourly Labor Rate Including Fringes | \$11.80 | \$11.70 | \$11.50 | \$11.40 | \$11.20 | \$11.00 | |
| Projected 1985 Import Tons (000) | - | - | - | - | - | - | |

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

VALVES AND FITTINGS MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 56 | 18 | 9 | 7 | 8 | 2 |
| Indiana | 47 | 32 | 11 | 5 | 4 | 1 |
| Michigan | 47 | 32 | 11 | 5 | 4 | 1 |
| Ohio | 54 | 25 | 12 | 5 | 3 | 1 |
| Pennsylvania | 61 | 21 | 5 | 6 | 4 | 3 |
| Wisconsin | 50 | 25 | 16 | 6 | 3 | - |
| Other | 59 | 23 | 9 | 4 | 3 | 2 |

Corrosion Resistant

| | | | | | | |
|--------------|----|----|----|---|---|---|
| Illinois | 48 | 26 | 13 | 5 | 5 | 3 |
| Indiana | 62 | 13 | 13 | 4 | 4 | 4 |
| Michigan | 62 | 13 | 13 | 4 | 4 | 4 |
| Ohio | 62 | 23 | 9 | 3 | 2 | 1 |
| Pennsylvania | 59 | 25 | 9 | 3 | 2 | 2 |
| Wisconsin | 44 | 40 | 9 | 3 | 2 | 2 |
| Other | 69 | 20 | 7 | 2 | 1 | 1 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

CONSTRUCTION EQUIPMENT MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 29 | 40 | 22 | 8 | 1 | - |
| Indiana | 25 | 40 | 20 | 10 | 5 | - |
| Michigan | 40 | 40 | 20 | - | - | - |
| Ohio | 65 | 27 | 5 | 3 | - | - |
| Pennsylvania | 20 | 65 | 15 | - | - | - |
| Wisconsin | 20 | 31 | 21 | 21 | 7 | - |
| Other | 25 | 45 | 10 | 13 | 6 | 1 |

Manganese

| | | | | | | |
|--------------|----|----|----|----|----|---|
| Illinois | 13 | 61 | 26 | - | - | - |
| Indiana | 13 | 61 | 26 | - | - | - |
| Michigan | | | | | | |
| Ohio | 13 | 61 | 26 | - | - | - |
| Pennsylvania | 13 | 61 | 26 | - | - | - |
| Wisconsin | 60 | 30 | 10 | - | - | - |
| Other | 30 | 30 | 20 | 10 | 10 | - |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MINING EQUIPMENT MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 84 | 16 | - | - | - | - |
| Indiana | 33 | 45 | 22 | - | - | - |
| Michigan | 33 | 46 | - | - | 21 | - |
| Ohio | 14 | 58 | 16 | 12 | - | - |
| Pennsylvania | 54 | 32 | 14 | - | - | - |
| Wisconsin | 18 | 41 | 16 | 11 | 7 | 7 |
| Other | 55 | 33 | 12 | - | - | - |

Manganese

Approximately 90% of tonnage sold directly to user as spare parts.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MILL MACHINERY MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 50 | 5 | 6 | 9 | 15 | 15 |
| Indiana | 50 | 5 | 6 | 9 | 15 | 15 |
| Michigan | | | Unidentified | | | |
| Ohio | 24 | 6 | 7 | 26 | 24 | 13 |
| Pennsylvania | 57 | 3 | 3 | 7 | 9 | 21 |
| Wisconsin | 50 | 5 | 6 | 9 | 15 | 15 |
| Other | | | Unidentified | | | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PUMP MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 56 | 22 | 22 | - | - | - |
| Indiana | 45 | 48 | 7 | - | - | - |
| Michigan | 100 | - | - | - | - | - |
| Ohio | 63 | 13 | 21 | 3 | - | - |
| Pennsylvania | 15 | 29 | 51 | 5 | - | - |
| Wisconsin | 100 | - | - | - | - | - |
| Other | 21 | 23 | 21 | 18 | 13 | 4 |

Corrosion Resistant

| | | | | | | |
|--------------|-----|----|----|----|---|---|
| Illinois | 28 | 36 | 36 | - | - | - |
| Indiana | 48 | 42 | 10 | - | - | - |
| Michigan | 100 | - | - | - | - | - |
| Ohio | 12 | 65 | 23 | - | - | - |
| Pennsylvania | 19 | 31 | 28 | 17 | 4 | 1 |
| Wisconsin | 100 | - | - | - | - | - |
| Other | 25 | 24 | 21 | 22 | 7 | 1 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

TRUCK, BUS, AND TRAILER MARKET

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGE

| <u>Carbon and Low Alloy</u> | <u>Percent of Tons by State</u> | | | | | |
|-----------------------------|---------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Illinois | 45 | 45 | 10 | - | - | - |
| Indiana | 100 | - | - | - | - | - |
| Michigan | 44 | 43 | 13 | - | - | - |
| Ohio | 64 | 30 | 5 | 1 | - | - |
| Pennsylvania | 100 | - | - | - | - | - |
| Wisconsin | 45 | 45 | 10 | - | - | - |
| Other | 49 | 51 | - | - | - | - |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MISCELLANEOUS MARKET SEGMENTS

CARBON AND LOW ALLOY STEEL CASTING SIZE-WEIGHT DISTRIBUTION

| <u>Miscellaneous Market Segments</u> | <u>Percent of Tons by Market</u> | | | | | |
|--|----------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Power Transmissions and Speed Changers | 40 | 30 | 20 | 5 | 5 | - |
| Motors and Generators | 40 | 11 | 5 | 14 | 30 | - |
| Engines and Turbines | 5 | 5 | 10 | 5 | 15 | 60 |
| Metal Working Ma- chinery and Special Tools and Dies | 26 | 3 | 35 | 10 | 15 | 11 |
| Industrial Trucks | 90 | 10 | - | - | - | - |
| Tanks (Military) | 14 | - | 17 | 26 | 43 | - |
| Farm Equipment | 29 | 40 | 22 | 8 | 1 | - |
| Oil Field Equipment | 30 | 40 | 20 | 8 | 2 | - |
| Tools and Dies | 40 | 40 | 10 | 5 | 5 | - |
| Other Carbon Steel | 30 | 40 | 20 | 7 | 2 | 1 |
| Other Corrosion Resistant | 30 | 30 | 20 | 10 | 5 | 5 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

HEAT RESISTANT ALLOYS

STEEL CASTING SIZE-WEIGHT DISTRIBUTION BY WEIGHT RANGES

| <u>Miscellaneous Market Segments</u> | <u>Percent of Tons by Market</u> | | | | | |
|--|----------------------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|
| | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> |
| Industrial Furnaces and Other Miscel- laneous Castings | 80 | 20 | - | - | - | - |
| Reformer and Ethylene Tube Bends and "Y"s | 70 | 30 | - | - | - | - |
| Other | 50 | 30 | 10 | 10 | - | - |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

TOTAL PROJECTED DEMAND, CAPTIVE PRODUCTION,
IMPORTS, AND NET AVAILABLE MARKET FOR
CARBON AND LOW ALLOY STEEL CASTINGS IN 1985
(000 Tons)

| <u>Market Segment</u> | <u>Demand</u> | <u>Captive Supply</u> | <u>Imports</u> | <u>Net Available Market</u> |
|-------------------------|---------------|-----------------------|----------------|-----------------------------|
| Valves and Fittings | 50.60 | 2.00 | 20.20 | 48.60 |
| Engines and Turbines | 10.25 | - | 3.10 | 10.25 |
| Farm Equipment | 2.00 | - | - | 2.00 |
| Construction Equipment | 166.00 | 16.00 | 49.80 | 150.00 |
| Mining Equipment | 93.60 | 8.00 | 18.70 | 85.60 |
| Oil Field Equipment | 3.50 | - | 1.00 | 3.50 |
| Industrial Trucks | 2.12 | - | 0.30 | 2.12 |
| Machine Tools | 1.50 | - | - | 1.50 |
| Tools and Dies | 2.70 | - | - | 2.70 |
| Mill Machinery | 30.00 | 8.00 | 0.40 | 22.00 |
| Pumps | 10.00 | 2.00 | 2.00 | 8.00 |
| Power Transmissions | 2.75 | 0.50 | - | 2.25 |
| Trucks, Buses, Trailers | 92.00 | 8.00 | 18.40 | 84.00 |
| Motors and Generators | 2.53 | - | - | 2.53 |
| Tanks | 5.50 | - | - | 5.50 |
| Other | <u>11.00</u> | <u>1.00</u> | <u>2.20</u> | <u>10.00</u> |
| Total | 486.05 | 45.5 | 116.10 | 440.55 |

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

TOTAL PROJECTED DEMAND, CAPTIVE PRODUCTION,
IMPORTS, AND NET AVAILABLE MARKET FOR
CORROSION RESISTANT STEEL CASTINGS IN 1985
(000 Tons)

| <u>Market Segment</u> | <u>Demand</u> | <u>Captive Supply</u> | <u>Imports</u> | <u>Net Available Market</u> |
|----------------------------|---------------|-----------------------|----------------|-----------------------------|
| Valves and Fittings | 16.7 | 2.2 | 3.3 | 14.5 |
| Special Industry Machinery | 3.2 | - | 0.8 | 3.2 |
| Pumps | 3.4 | 0.8 | 0.8 | 2.6 |
| Other | <u>2.5</u> | <u>-</u> | <u>0.5</u> | <u>2.5</u> |
| Total | 25.8 | 3.0 | 5.4 | 22.8 |

HEAT RESISTANT STEEL CASTINGS IN 1985
(000)

| <u>Market Segment</u> | <u>Demand</u> | <u>Captive Supply</u> | <u>Imports</u> | <u>Net Available Market</u> |
|-----------------------|---------------|-----------------------|----------------|-----------------------------|
| Special Industry | .7 | - | .2 | 0.7 |
| Furnace and Ovens | 1.25 | - | .2 | 1.25 |
| Others | <u>1.2</u> | <u>-</u> | <u>.1</u> | <u>1.2</u> |
| | 3.15 | | .5 | 3.15 |

* Static cast only.

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

TOTAL PROJECTED DEMAND, CAPTIVE PRODUCTION,
IMPORTS, AND NET AVAILABLE MARKET FOR
MANGANESE STEEL CASTINGS IN 1985
(000 Tons)

| <u>Market Segment</u> | <u>Demand</u> | <u>Captive Supply</u> | <u>Imports</u> | <u>Net Available Market</u> |
|------------------------|---------------|-----------------------|----------------|-----------------------------|
| Construction Equipment | 2.5 | 0.5 | - | 2.0 |
| Mining Equipment | 1.9 | 0.3 | - | 1.6 |
| Other | <u>1.1</u> | <u>0.1</u> | <u>-</u> | <u>1.0</u> |
| Total | 5.5 | 0.9 | - | 4.6 |

Note: All data relative to the subject six-state region.

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PROJECTED 1985 DEMAND, SUPPLY, AND IMPORT CONDITIONS
IN THE SIX-STATE REGION FOR
CARBON AND LOW ALLOY STEEL CASTINGS
(000 Tons)

| Casting Wgt. Range (lbs.) | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | <u>Total</u> |
|-------------------------------------|----------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| Regional Demand | 187 | 165 | 70 | 33 | 18 | 13 | 486 |
| Regional Supply | 213 | 183 | 78 | 35 | 17 | 12 | 538 |
| Excess or (Short- age) of Supply | 26 | 18 | 8 | 2 | (1) | (1) | 52 |
| Projected Imports | 45 | 39 | 17 | 8 | 4 | 3 | 116 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PROJECTED 1985 DEMAND, SUPPLY, AND IMPORT CONDITIONS

IN THE SIX-STATE REGION FOR

CORROSION RESISTANT STEEL CASTINGS

(000 Tons)

| Casting Wgt. Range (lbs.) | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | <u>Total</u> |
|-------------------------------------|----------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| Regional Demand | 13.50 | 6.70 | 3.30 | 1.20 | 0.70 | 0.50 | 25.90 |
| Regional Supply | 15.00 | 7.20 | 3.40 | 1.20 | 0.66 | 0.45 | 27.91 |
| Excess or (Short- age) of Supply | 1.50 | 0.50 | 0.10 | - | (0.04) | (0.05) | 2.01 |
| Projected Imports | 2.80 | 1.40 | 0.70 | 0.30 | 0.10 | 0.10 | 5.40 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PROJECTED 1985 DEMAND, SUPPLY, AND IMPORT CONDITIONS
IN THE SIX-STATE REGION FOR
HEAT RESISTANT STEEL CASTINGS
(000 Tons)

| Casting Wgt. Range (lbs.) | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | <u>Total</u> |
|-------------------------------------|----------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| Regional Demand | 9.1 | 2.7 | 0.1 | 0.1 | - | - | 12.0 |
| Regional Supply | 9.6 | 2.8 | 0.1 | 0.1 | - | - | 12.6 |
| Excess or (Short- age) of Supply | 0.5 | 0.1 | - | - | - | - | 0.6 |
| Projected Imports | 1.8 | 0.4 | - | - | - | - | 2.2 |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PROJECTED 1985 DEMAND, SUPPLY, AND IMPORT CONDITIONS
IN THE SIX-STATE REGION FOR
MANGANESE STEEL CASTINGS
(000 Tons)

| Casting Wgt. Range (lbs.) | <u>Under 100</u> | <u>101 to 500</u> | <u>501 to 1,000</u> | <u>1,001 to 5,000</u> | <u>5,001 to 10,000</u> | <u>Over 10,000</u> | <u>Total</u> |
|-------------------------------------|----------------------|-----------------------|-------------------------|---------------------------|----------------------------|------------------------|--------------|
| Regional Demand | 1.7 | 2.4 | 1.1 | 0.1 | 0.1 | - | 5.4 |
| Regional Supply | 1.8 | 2.5 | 1.2 | 0.1 | 0.1 | - | 5.7 |
| Excess or (Short- age) of Supply | 0.1 | 0.1 | 0.1 | - | - | - | 0.3 |
| Projected Imports | - | - | - | - | - | - | - |

MAJOR VALVE MANUFACTURERS IN THE UNITED STATES
PROJECTED 1983 CONSUMPTION OF CARBON AND LOW ALLOY STEEL CASTINGS
BY FOUNDRY PROCESS (TONS)

| Casting Weight Range in Pounds | Molding Process | | Under 100 | | 101 to 500 | | 501 to 1,000 | | 1,001 to 5,000 | | 5,001 to 10,000 | | Over 10,000 | | Plant Locations |
|--------------------------------|-----------------|--------|-----------|-------|------------|-------|--------------|-------|----------------|-------|-----------------|-------|-------------|-------|---|
| | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | |
| Rockwell International | 740 | 370 | 350 | 150 | 185 | 75 | 85 | 60 | 75 | | | | | | Carpentersville, IL; Raleigh, NC; Sulphur Springs, TX |
| Henry Pratt Co. | 220 | 80 | 70 | 45 | 75 | | 75 | 100 | | | | | | | Aurora, IL |
| Convel, Inc. | 740 | 300 | 1,100 | 75 | 370 | | 150 | 150 | | | | | | | Hammond, IN; Cincinnati, OH |
| Henry Vogt Machine Co., Inc. | 590 | 300 | 210 | 150 | 150 | | 75 | 45 | | | | | | | Louisville, KY |
| Xomox | 520 | 220 | 150 | 110 | 75 | | 30 | 20 | | | | | | | Cincinnati, OH |
| William Powell Co. | 1,920 | 590 | 700 | 150 | 515 | | 260 | 125 | | | | | | | Cincinnati, OH |
| Dresser Industries | 740 | 370 | 300 | 150 | 185 | | 85 | 50 | | | | | | | Anniston, AL; Stratford, CT; Alexandria, LA; Wellsboro, PA |
| Duriron Co. Inc. | 740 | 370 | 300 | 150 | 185 | | 75 | 35 | | | | | | | Dayton, OH; Warminster, PA; Cookeville, TN |
| Walworth | 740 | 300 | 290 | 150 | 150 | | 110 | 60 | | | | | | | Canton, MA; Linden, NJ; Greensburg, PA; King of Prussia, PA |
| Leslie Co. | 370 | 150 | 80 | 75 | 75 | | 75 | 100 | | | | | | | Parsippany, NJ |
| ITT | 300 | 80 | 70 | 45 | 75 | | 150 | 100 | | | | | | | Chicago, IL; Indianapolis, IN; Amory, MS; Chatsworth, CA |
| Tufline (Xomox) | 740 | 300 | 300 | 150 | 185 | | | | | | | | | | Cincinnati, OH |
| Pittsburg Brass Mfg. Co. | 220 | | | | | | | | | | | | | | Irwin, PA |
| American Meter | 220 | | | | | | | | | | | | | | Philadelphia, PA |
| Crane Co. | 520 | 150 | 300 | 75 | 185 | | 75 | 75 | | | | | | | Chicago, IL; Indian Orchard, MA; Washington, IA; Warrington, PA |
| Jenkins Brothers | 590 | 300 | 200 | 45 | 150 | | 75 | 45 | | | | | | | Bridgeport, CT |
| Jamesbury Corp. | 1,650 | 750 | 700 | 300 | 430 | | 150 | 75 | | | | | | | Worcester, MA |
| Crosby Valve & Gage Co. | 520 | 150 | 180 | 75 | 75 | | 75 | 35 | | | | | | | Wrentham, MA |
| Ladish Co. | 1,480 | 370 | 750 | 150 | 590 | | 220 | 110 | | | | | | | Kenosha, WI; Cudahy, WI; Cynthiana, KY |
| Fisher Controls International | 1,460 | 590 | 350 | 220 | 75 | | 30 | | | | | | | | Sherman, TX; McKinney, TX; Coraopolis, PA; Marshalltown, IA |
| Brighton Corporation | 220 | | 70 | | 75 | | | | | | | | | | Cincinnati, OH |
| Posi-Seal International Inc. | 1,450 | 740 | 590 | 370 | 370 | | 110 | 50 | | | | | | | North Stonington, CT |
| Pacific Valve - Mark Controls | 740 | 370 | 300 | 150 | 185 | | 75 | 75 | | | | | | | Long Beach, CA; Evanston, IL; Lake Zurich, IL; Tulsa, OK |
| Watts Regulator Co. Inc. | 720 | 220 | 300 | 75 | | | | | | | | | | | Franklin, NH |
| Peabody Dore Corp. | 220 | 80 | 70 | 45 | | | | | | | | | | | Houston, TX |
| Taylor Oil Tools Inc. | 220 | | | | | | | | | | | | | | Oklahoma City, OK |
| Bailey-Hoogovens USA | 220 | | | | | | | | | | | | | | Washington, PA |
| Stockham Valves & Fittings Co. | 750 | 80 | 350 | 45 | 185 | | 75 | 35 | | | | | | | Birmingham, AL |
| Atwood-Morrill | 740 | 370 | 350 | 150 | 220 | | 295 | 255 | | | | | | | Salem, MA; Washington, NC |
| Nibco | | | | | 185 | | 150 | 100 | | | | | | | Augusta, AR; Blytheville, AR; Dayton, OH |
| Miscellaneous Other | 6,200 | 4,900 | 1,800 | 2,800 | 2,600 | | 1,200 | 500 | | | | | | | |
| Process Totals | 26,500 | 12,500 | 10,300 | 5,900 | 7,400 | | 3,700 | 2,200 | | | | | | | |
| Size Range Totals | 39,000 | | 16,200 | | 7,400 | | 3,700 | 2,200 | | | | | | | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MAJOR VALVE MANUFACTURERS IN THE UNITED STATES
PROJECTED 1983 CONSUMPTION OF CORROSION RESISTANT STEEL CASTINGS
BY FOUNDRY PROCESS (TONS)

| Casting Weight Range in Pounds | Molding Process | | Under 100 | | 101 to 500 | | 501 to 1,000 | | 1,001 to 5,000 | | 5,001 to 10,000 | | Over 10,000 | | Plant Locations |
|--------------------------------|-----------------|-------|-----------|-------|------------|-------|--------------|-------|----------------|-------|-----------------|-------|-------------|-------|---|
| | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | Sand | Shell | |
| Rockwell International | 230 | 60 | | | 60 | 30 | 60 | 30 | 30 | 30 | 30 | 10 | | 10 | Carpentersville, IL; Raleigh, NC; Sulphur Springs, TX |
| Henry Pratt Co. | 60 | 10 | | | 60 | 10 | 30 | 10 | 10 | 10 | 10 | 10 | | 10 | Aurora, IL |
| Conval, Inc. | 230 | 60 | | | 110 | | 110 | | 30 | 30 | 30 | 30 | | 30 | Hammond, IN; Cincinnati, OH |
| Henry Vogt Machine Co., Inc. | 100 | 280 | | | 110 | 90 | 60 | 20 | 20 | 10 | 10 | | | | Louisville, KY |
| Xomox | 620 | 110 | | | 110 | 110 | 110 | 30 | 30 | 10 | 10 | | | | Cincinnati, OH |
| William Powell Co. | 620 | 110 | | | 110 | 110 | 110 | 30 | 30 | 10 | 10 | | | 10 | Cincinnati, OH |
| Dresser Industries | 230 | 110 | | | 170 | 60 | 110 | 30 | 20 | 20 | 20 | | | 10 | Anniston, AL; Stratford, CT; Alexandria, LA; Wellaboro, PA |
| Duriron Co. Inc. | 280 | 60 | | | 110 | 30 | 30 | 20 | 20 | 20 | 20 | | | 10 | Dayton, OH; Warminster, PA; Cookeville, TN |
| Walworth | 230 | 60 | | | 110 | 30 | 60 | | | | | | | | Canton, MA; Linden, NJ; Greensburg, PA; King of Prussia, PA |
| Leslie Co. | 60 | 60 | | | | | 30 | 20 | 20 | 10 | 10 | | | 10 | Parsippany, NJ |
| ITT | 60 | 60 | | | 60 | 30 | 30 | 30 | 30 | 20 | 20 | | | 10 | Chicago, IL; Indianapolis, IN; Amory, MS; Chatsworth, CA |
| Tufline (Xomox) | 280 | 60 | | | 110 | 30 | | | | | | | | 10 | Cincinnati, OH |
| Pittsburg Brass Mfg. Co. | 60 | | | | | | | | | | | | | | Irwin, PA |
| American Meter | 60 | | | | | | | | | | | | | | Philadelphia, PA |
| Crane Co. | 100 | 30 | | | 60 | 30 | 30 | 20 | 20 | 20 | 20 | | | 20 | Chicago, IL; Indian Orchard, MA; Washington, IA; Warrington, PA |
| Jenkins Brothers | 230 | 60 | | | 60 | 10 | 60 | 10 | 10 | 10 | | | | | Bridgeport, CT |
| Jamesbury Corp. | 1,020 | 280 | | | 170 | 90 | 60 | 10 | 10 | | | | | | Worcester, MA |
| Crosby Valve & Gage Co. | 110 | 30 | | | 60 | 30 | 60 | | | | | | | | Wrentham, MA |
| Ladish Co. | 230 | 60 | | | 110 | 60 | 60 | 20 | 20 | 10 | 10 | | | 10 | Kenosha, WI; Cudahy, WI; Cynthia, KY |
| Fisher Controls International | 170 | | | | | | | | | | | | | | Sherman, TX; McKinney, TX; Coraopolis, PA; Marshalltown, IA |
| Brighton Corporation | 60 | 60 | | | | | | | | | | | | | Cincinnati, OH |
| Posi-Seal International Inc. | 340 | 230 | | | 110 | 60 | 60 | 10 | 10 | 10 | | | | | North Stonington, CT |
| Pacific Valve - Mark Controls | 170 | 60 | | | 110 | 60 | 60 | 20 | 20 | 10 | | | | 10 | Long Beach, CA; Evanston, IL; Lake Zurich, IL; Tulsa, OK |
| Watts Regulator Co. Inc. | 170 | 60 | | | 110 | 30 | | | | | | | | | Franklin, NH |
| Peabody Dore Corp. | 60 | 60 | | | | | | | | | | | | | Houston, TX |
| Taylor Oil Tools Inc. | 60 | | | | | | | | | | | | | | Oklahoma City, OK |
| Bailey-Hoogovens USA | 60 | | | | | | | | | | | | | | Washington, PA |
| Stockham Valves & Fittings Co. | 170 | 60 | | | 110 | 30 | 30 | 20 | 20 | 20 | | | | 20 | Birmingham, AL |
| Atwood-Morrill | | | | | | | | | | | | | | | Salem, MA; Washington, NC |
| Worcester Controls Corp. | 170 | | | | | | | | | | | | | | West Boylston, MA; Olive Branch, MS |
| Miscellaneous Other | 1,260 | 1,330 | | | 590 | 440 | 300 | 170 | 170 | 160 | | | | 90 | |
| Process Totals | 7,500 | 3,250 | | | 2,500 | 1,250 | 1,350 | 500 | 500 | 400 | | | | 250 | |
| Size Range Totals | 10,750 | | | | 3,750 | | 1,350 | 500 | 500 | 400 | | | | 250 | |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

PROJECTED STEEL INVESTMENT CASTING DEMAND
FOR THE VALVE AND FITTING MARKET

| <u>State</u> | <u>1983 Demand Tons</u> | | <u>1985 Demand Tons</u> | |
|--------------|-------------------------|----------------------------|-------------------------|----------------------------|
| | <u>Carbon Steel</u> | <u>Corrosion Resistant</u> | <u>Carbon Steel</u> | <u>Corrosion Resistant</u> |
| Illinois | 360 | 220 | 600 | 300 |
| Indiana | 450 | 80 | 750 | 100 |
| Michigan | 120 | 50 | 200 | 70 |
| Ohio | 3,600 | 3,800 | 6,000 | 5,350 |
| Pennsylvania | 1,980 | 1,700 | 3,300 | 2,400 |
| Wisconsin | 300 | 200 | 500 | 280 |
| Other States | <u>5,190</u> | <u>4,950</u> | <u>8,650</u> | <u>7,000</u> |
| Total | 12,000 | 11,000 | 20,000 | 15,500 |

Note: These investment casting tonnages are not included in the statistics used in other sections of this report.

MAJOR COMPETITIVE U.S. STEEL FOUNDRIES
(Six-State Region)

| Foundry | Captive Or Jobbing | Number of Plants | Capacity Annual Net Good Tons | | | | Major Markets Served | | | Alloys Produced | | | Productivity Level Man- Hours/Ton |
|--------------------------|--------------------------|---------------------|-------------------------------------|----------|---------------------------|-------------------|----------------------|--------|------------------------|-----------------------|-------------------|------------|---|
| | | | Mining | Railroad | Construction Equipment | Pumps & Valves | Truck | Other | Corrosion Resistant | Carbon & Low Alloy | Heat Resistant | Other | |
| Illinois | | | | | | | | | | | | | |
| Calumet | J | 1 | 2,000 | | 1,000 | | | 1,000 | X | X | | X Man-Aus. | 150 |
| Columbia | J | 1 | 8,000 | | | | 1,000 | 8,000 | | X | | | 55 |
| Electrocast | J | 1 | 3,000 | | 2,000 | | | | | X | | | 90 |
| Galtre | J | 1 | 2,000 | | | | | 2,000 | | X | | | 50 |
| Gunita | J | 1 | 60,000 | | 25,000 | 5,000 | 15,000 | 15,000 | | X | | | 35 |
| Midland Ross | J | 2 | 75,000 | 35,000 | 20,000 | | 15,000 | 5,000 | | X | | | 30 to 50 |
| Sterling Steel | J | 1 | 6,000 | | 2,000 | 2,000 | 2,000 | | | X | | | 30 to 35 |
| Alloy Engineering | J | 1 | 2,000 | | | 1,500 | | 500 | X | | X | | 60 to 70 |
| Universal Electric | J | 1 | 300 | | | | | 300 | X | | X | X Man | Not Available |
| Indiana | | | | | | | | | | | | | |
| American Steel Foundries | J | 1 | 25,000 | 20,000 | | | 5,000 | | | X | | | 40 to 60 |
| Electric Steel Foundry | J | 1 | 5,500 | 1,000 | 1,500 | | | 1,000 | | X | | | 65 |
| Harrison Steel Foundry | J | 1 | 31,000 | 5,000 | 10,000 | 1,000 | 1,000 | 14,000 | | X | | | 75 |
| Blaw-Knox | J | 1 | 43,000 | | 20,000 | | | 23,000 | | X | | | 50 |
| Dayton-Walther | J | 1 | 18,000 | | | | 15,000 | 3,000 | | X | | | 35 to 40 |
| Abex | J | 1 | 12,000 | 2,000 | 3,000 | | | 8,000 | | X | | X Man-Aus. | Not Available |
| Michigan | | | | | | | | | | | | | |
| AM Holist Bay City | C | 1 | 5,000 | | 5,000 | 1,000 | | 5,000 | X | X | | X Man-Aus. | 50 |
| Mid Ross Bay City | J | 1 | 10,000 | | 4,000 | | | 1,000 | X | X | X | X Man-Aus. | 45 |
| Berne Enterprises | J | 1 | 3,000 | 1,000 | | 1,000 | | 1,000 | X | X | | | Not Available |
| Delray Steel Castings | J | 1 | 6,000 | | 3,000 | | 1,000 | 2,000 | X | X | | | Not Available |
| Huron Casting Inc. | J | 1 | 6,000 | | 2,000 | | | 3,000 | X | X | | X Man | 60 |
| Resisto-Loy Co. Inc. | J | 1 | 1,800 | | | | | 1,800 | X | X | X | X Man | 75 |
| Tech-Cast | J | 1 | 4,800 | 1,000 | 4,000 | | 3,000 | 800 | X | X | X | X Man-Aus. | 55 |
| Westran Corp. | J | 1 | 15,000 | 2,000 | | 4,000 | 4,000 | 1,000 | X | X | | | 70 |
| Ohio | | | | | | | | | | | | | |
| Abex | J | 1 | 7,000 | 3,000 | | 2,000 | | 2,000 | X | | X | | Not Available |
| Advance | J | 1 | 4,800 | | 2,800 | | | 2,000 | | X | | X Man-Aus. | Not Available |
| Alloy Cast Steel Co. | J | 1 | 3,000 | 1,000 | 1,000 | | | 1,000 | | X | | | 78 |
| American Steel Foundries | J | 1 | 65,000 | 60,000 | | | | 5,000 | | X | | | 40 to 60 |
| Atlantic Foundry Co. | J | 1 | 14,000 | 7,000 | 3,000 | | | 2,000 | | X | | | 84 |
| Babcox Wilcox | 60J-40C | 1 | 1,800 | | | | | 1,800 | X | X | X | | Not Available |
| Buckeye Steel | J | 1 | 80,000 | 75,000 | | | 2,000 | 3,000 | X | X | | | 50 to 55 |
| Cleveland Alloy Castings | J | 1 | 2,100 | | | | | 2,100 | X | X | X | | 90 |
| Columblane | J | 1 | 6,000 | 2,000 | | | | 4,000 | X | X | X | | 60 to 65 |

MAJOR COMPETITIVE U.S. STEEL FOUNDRIES
(Six-State Region)

| Foundry | Captive Or Jobbing | Number of Plants | Capacity Annual Net | | | | Major Markets Served | | | | Alloys Produced | | | Productivity Level Men- Hours/Ton |
|-------------------------------|--------------------------|---------------------|------------------------|--------|----------|---------------------------|----------------------|--------|--------|------------------------|-----------------------|-------------------|----------|---|
| | | | Good Tons | Mining | Railroad | Construction Equipment | Pumps & Valves | Truck | Other | Corrosion Resistant | Carbon & Low Alloy | Heat Resistant | Other | |
| Ohio (Continued) | | | | | | | | | | | | | | |
| Crucible Steel | J | 1 | 8,500 | 2,000 | | 2,000 | 2,000 | 22,000 | 2,500 | X | X | | | Not Available |
| Dayton-Walther | C | 1 | 22,000 | | | | 4,800 | | | X | X | | | 40 |
| Duriron | J | 1 | 4,000 | | | | 1,200 | | | X | | X | | 220 |
| Fisher Cast Steel Products | J | 1 | 1,200 | | | | | | 4,200 | | X | | | 120 |
| Larion Consolidated | J | 1 | 4,200 | | | | | | | | X | | | 50 |
| Marion Power Shovel (Dresser) | J | 1 | 7,000 | | | 7,000 | | | | | X | X | | 60 |
| Mason Steel Castings | J | 1 | 7,500 | 2,000 | | 2,000 | 1,000 | 1,000 | 1,000 | | X | | | 80 |
| Masillon Steel Castings | J | 1 | 14,000 | | 10,000 | | 1,000 | | 1,000 | | X | | | 50 |
| Midland Ross | J | 1 | 7,000 | 2,000 | | | 3,000 | | 13,000 | X | X | X | Man-Aus. | Not Available |
| Sandusky Foundry & Machine | J | 1 | 18,000 | 2,000 | | | 1,000 | 1,000 | 4,000 | | X | | | 70 |
| Sawbrook Steel | J | 1 | 7,000 | 1,000 | | | 2,000 | | 1,600 | X | X | | | 70 |
| Teledyne Chlocast | J | 1 | 3,600 | | | | | | | | | | | |
| Pennsylvania | | | | | | | | | | | | | | |
| Bathlehem Steel | C | 2 | 25,000 | | | | | | 25,000 | X | X | X | Man-Aus. | 55 |
| Birdboro Corp. | J | 1 | 30,000 | | 5,000 | | 3,000 | | 22,000 | X | X | | | 70 |
| Dodge Foundry & Machine | J | 1 | 7,500 | | | | 7,500 | | | X | X | | | 75 |
| Duraloy Braw-Knox | J | 1 | 7,000 | | | | 4,000 | | 3,000 | X | X | X | | 120 |
| Ellwood Steel Castings | J | 1 | 4,800 | | | | | | 4,800 | | X | | | Not Available |
| Empire Steel | J | 1 | 6,000 | | | | 3,000 | | 3,000 | X | X | | | 130 |
| Frog Switch | J | 1 | 25,000 | | 20,000 | | | | 5,000 | X | X | | X | 90 |
| General Alloy | J | 1 | 5,000 | | | | | | | X | X | | | Not Available |
| Goyne Pump (Goulds) | C | 1 | 1,600 | | | | 1,600 | | | X | X | X | | Not Available |
| Koppers-Sprout Waldron | C | 1 | 2,000 | | | | | | | X | X | | | Not Available |
| Larabie Foundry | J | 1 | 2,500 | | | | | | | X | X | | | 100 |
| Lebanon Steel | J | 1 | 9,600 | | | | 7,600 | | 2,000 | X | X | | | 40 |
| Mackintosh-Hemphill (G&W) | J | 1 | 25,000 | | | | | | 2,500 | X | X | | | 150 |
| McConvey & Torley | J | 2 | 55,000 | | 44,000 | 8,000 | | | 2,000 | | X | | | 60 |
| National Castings (Mid-Rose) | J | 1 | 55,000 | | 49,000 | | | | 2,000 | X | X | | | 25 |
| Oil Well Div. (U.S. Steel) | J | 1 | 4,800 | 6,000 | | | | 1,000 | 4,800 | | X | X | | 30 |
| Pennsylvania Steel | J | 1 | 4,800 | | | 800 | 2,000 | | 1,000 | X | X | | | 60 |
| Quaker Alloy | J | 1 | 7,200 | | | | 6,000 | | 1,200 | X | X | | | 140 |
| Union Specialty Steel | J | 1 | 8,400 | 7,000 | | | | | 1,400 | | X | | X | 150 |
| Wean United | J | 1 | 42,000 | | | | | | 42,000 | | X | | | Not Available |

DEPARTMENT OF EXTERNAL AFFAIRS
OTTAWA, CANADA

MAJOR COMPETITIVE U.S. STEEL FOUNDRIES
(Six-State Region)

| Foundry | Captive Or Jobbing | Number of Plants | Capacity Annual Net Good Tons | Major Markets Served | | | | Corrosion Resistant | Alloys Produced | | Productivity Level Man- Hours/Ton |
|-------------------------------|--------------------------|---------------------|-------------------------------------|---------------------------|-------------------|--------|--------|------------------------|-----------------------|-------------------|---|
| | | | | Construction Equipment | Pumps & Valves | Truck | Other | | Carbon & Low Alloy | Heat Resistant | |
| Wisconsin | | | | | | | | | | | |
| Arneson Foundry, Inc. | J | 1 | 7,000 | | | | 7,000 | | X | | Not Available |
| Bucyrus-Erie Co. | C | 1 | 40,000 | 20,000 | | | 8,000 | | X | | 35 to 45 |
| Falk Corp. (Sunstrand) | 50J-50C | 1 | 24,000 | 5,000 | | | 13,000 | | X | | 45 |
| Gartland Foundries Inc. | J | 1 | 2,000 | | 500 | | 1,000 | X | X | X | 150 |
| Grede Foundries Inc. | J | 1 | 14,000 | 6,000 | 2,000 | | 1,000 | | X | X | 40 to 50 |
| Harris Metals Inc. | J | 1 | 3,000 | | | | 3,000 | X | X | X | Not Available |
| Crucible Steel (Howmet) | J | 1 | 24,000 | 10,000 | 2,000 | | 9,000 | X | X | X | Not Available |
| Jenco, Inc. | J | 1 | 3,500 | 1,000 | | | 1,500 | X | X | X | 40 |
| Maynard Steel | J | 1 | 20,000 | 8,000 | 2,000 | 2,000 | 6,000 | X | X | X | Not Available |
| Evinrude Motors | C | 1 | 8,000 | | | | 8,000 | X | X | | 40 |
| Pelton Caststeel, Inc. | J | 1 | 15,000 | 4,000 | 3,000 | 1,000 | 7,000 | X | X | | 60 |
| Rexnord | J | 1 | 35,000 | 6,000 | 3,000 | 20,000 | 5,000 | X | X | | Not Available |
| Stainless Foundry & Eng. Inc. | 60J-40C | 1 | 7,000 | 2,000 | 1,000 | | 3,000 | X | X | | 220 |
| Waukegan | J | 1 | 2,000 | | | | 1,000 | X | | X | 150 |
| Wehr Steel | J | 1 | 25,000 | 10,000 | | | 5,000 | X | X | X | 45 |
| Wisconsin Centrifugal | J | 1 | 15,000 | | 5,000 | | 10,000 | X | | X | 200 |

BIBLIOGRAPHY

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U.S. Business Outlook 1983

Stratecasts, Inc. "Demand and Supply of Metal Castings"

Wharton Econometrics

